The Chemical Age

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Notes and Comments

An Opportunity for Manufacturers

INTER-RELATIONSHIP between chemistry and agriculture has in the past provided important outlets for chemical products. The provision of fertilisers is indeed one of the largest branches of chemical manufacture. Copper sulphate, arsenic salts, and other substances are prepared in considerable quantities for spraying, whilst in many countries sulphur in a finely subdivided form is used for combating the activities of certain insects. Coming to the more humble uses of agricultural chemicals the provision of arsenic compounds and potassium chlorate for the purposes of weed killing, are well-established activities of chemical manufacture. One of the difficulties which confronts the fruit grower is the loss of his crops owing to late frosts. This is a matter of the greatest importance to fruit growers, and affects even such favoured countries as sunny California. At first sight it would appear as though the only provision against this difficulty is some form of heating, which in its turn might mean the provision of large and uneconomical expensive greenhouses. Extensive experiments have been conducted in the growing of cereals by heating the soil by means of electricity in the form of electric resistance wires placed just below the surface, but even were the cheapest electricity available, it would be, commercially, virtually impossible to heat the foliage of trees by this means. Consideration of the causes of frost, however, shows that it is due in the first place to excessive radiation from the ground into the clear sky.

Smudge Fires

EXCEPT under the abnormal conditions—that is, abnormal for the time of year—of an exceptionally cold wind from the polar regions, possibly bringing with it a fall of snow, we cannot remember having seen a night frost coupled with a cloudy sky; the reason being that the radiation from the earth is re-radiated back from the clouds. Professor Hodgkinson has recently pointed out that more than 20 years ago there was used in California a device known as "smudge fires," for producing smoke in peach orchards. These "smudge" fires produced a smoke fog sufficiently voluminous to reach to the tops of the trees. It was stated that they were efficient in warding off the spring frosts from the early bloom and setting fruit buds. The fires were not lit for the purpose of heating the orchard, for which, of course, they would be almost entirely ineffectual, but the smokiness served as a fog which stopped the radiation from the earth and so prevented ground frosts. With the experience gained in the dissemination of poisonous gas during the war the chemical industry would be in a particularly good position to manufacture and market a substance which could be sold throughout the Empire and England, whereby without great expense the necessary fog could be produced throughout fruit orchards during the night until the frosts were over, and in addition it might be possible that ingredients could be incorporated in the smoke having some insecticidal value. We are not sure whether the obnoxious insects are at that time of the year in a condition in which they are capable of being affected by the poison; at all events there should be the market for the smoke producing compound itself.

Japanese Competition

THE competition of Japan, not only in the markets of the Far East, but even in England, has been causing serious alarm in industrial circles. This competition takes many forms and is increasing. Whilst, for example, three-quarters of Japan's trade with India has been within the textile group, sales of other items in that country are increasing and include chemicals. To East Africa chemicals, paper and cement are being exported from Japan in increasing quantities. The rubber industry is one in which Japan has shown striking activity within recent years, and indeed last year her principal market for rubber shoes and boots was Great Britain. Within seven years from starting the industry Japan has made herself the world's second largest producer of rayon, whilst the latest field to be entered is that of artificial wool. The Japanese dyestuffs industry commenced in 1915 and now supplies some 75 per cent. of the total requirements of the country, and sulphur black and methyl violet are now being exported. Soap is another article in which Japan is forging ahead.

What is the meaning of it all? Why this sudden activity on the part of the little Japs: As is usual in such instances we have to look deep down into the human problems of life to discover the answer. The natural increase of Japan's population last year was over a million, and Japan has a million more mouths to feed and 250,000 more jobs to find each year for the next twenty years. For the next ten years, to put it another way, Japan must find work and food for nearly 10,000,000 more people than she employs and feeds to-day. Japan, with 959 people to the square mile,

is by far the most densely populated land in the world, some 2½ times more so than Belgium. Industrial expansion has been Japan's solution to her problems and it must be confessed that she has made, from her point of view, a remarkably good attempt. If by tariffs and other protective measures the other nations of the world prevent that expansion, there will be formed a sphere of rapidly mounting internal pressure. Not even the most elaborate calculations can determine the bursting pressure nor forecast accurately the time that will elapse before explosion, but it needs only commonsense to see that the explosion will occur if a safety valve is not provided.

Monsterium, the Hydrogen Heavy-weight

THE latest gun manned by the Cambridge physical heavy-weights—heavy water—was brought into position and boomed heavily from the Royal Society platform, last month, advisedly heralded by puffs preliminarily in " Nature," " The Times " and elsewhere. The house was well papered; indeed, the ante-room was little short of crowded to suffocation: the claque came early, descending like a swarm of locusts upon the Society's hospitable tea-table, clearing the boards soon after the opening of the doors. The promoters of the entertainment seem to look forward to a sensational run of the new piece. We are not so sure that it will continue to attract, when first night enthusiasm has been damped down; the promise of novelty in its situations is too slight; no Ethyl is in sight to prevent knocks. For the time being, the play is a good foil to the Loch Ness Monster and may even call off attention from Beer but we doubt if it will lead any ordinary mortal to Mrs. Bovril. The Press could see little in the meeting but a dispute over names.

Monsterium: His Mark.

We have delayed these notes in order to print a picture of the Monster as seen by our Boy Scouts in Loch Ness. It is there, sure enough; they see it rolling about, like naphthalene in a sea of benzene — but do not vouch for humps.

Monsterium was not born in British waters and is merely a child by adoption of the Cambridge school. Coming to us, as it does, from across the herring pond, straight from Uesania, the foundling might well be dubbed *Uesanium*, contrariwise *Woollywestium*. However, Lord Rutherford now has in heavy hydrogen a nice new rattle which he can shake in defiance of all the outer world, starry charms of Eddington and Jeans. Cambridge to-day is indeed a wonderful place, happy in the triune conjunction of three such orbs, not forgetting the bright effulgence of a near Aston star, once the satelite of a now distant, great luminary, dispensng light to-day only from the comfortable shelf of a Magistral lodge. Cambridge may look forward to a line'o'light illumination of the outlines of the Cavendish in terms of some characteristic section of the Monsterium spectrum—putting Neon into the shade as a medium of bold advertisement. At intervals, perhaps, magic stars will appear in the field, as the heavy atoms are bombarded by high speed ballistons and their timbers shivered into protons and suppositrons—though not often, perhaps: only about one per cent. fell victims, it was said, compared with the number when beryllium is struck.

Lord Rutherford, at whose call, no doubt, the performance was staged, necessarily played the heavy father but in true D'Artagnan style: he spoke in clarion tones, as a conqueror should. He and later actors said little that was original—the bad habit of writing hurried letters to "Nature" destroys all atmosphere of surprise on such occasions. Perhaps his most striking announcement, showing what can be done with modern appliances, was the statement that, by repeated diffusion, heavy hydrogen had been obtained so nearly pure that the ordinary hydrogen spectrum was no longer to be seen in the gas. Obviously, he has gained a most powerful new ballistic weapon, with twice the punch of the ordinary hydrogen atom, for his further attacks upon atomic peace. We may expect next to hear that Dame Ethel Smyth is engaged upon a new version of her ' Wreckers ' to his libretto. As usually happens to actor managers, he was but poorly supported. His seconder from Oxford, speaking in cavernous undertones of limited audibility, had nothing cogent to say: Oxford, thus far, has kept its hands off the monster. Later came a great figure on the scene, also from Oxford, in Professor Soddy, an early worker (in Canada) with Lord Rutherford, joint discoverer with him of the tangible, gaseous emanation, spontaneously emitted from the thorium mantle —the most fundamental of all the discoveries in the field of radioactive change; one which set the ball rolling, in fact. Professor Soddy should have presented himself in Siegfrid attire, with Tarnhelm, Targe and Sword; he nearly looked the part without. Speaking in ringing tones, strange in the whispering gallery which is the R.S. meeting room, he wrathfully protested against the misuse of his term isotope. He implied that the new recruit is but a vulgar polymeride of the hydrogen with which we have long been familiar. Monsterium has been a surprisingly easy conquest; its existence once suspected, it has been electrolysed out of its burrow without difficulty. Why with so much cackle, it is difficult to say. The prospects of science are sad, if it once become synonymous with sensation. All we have learned is that hydrogen, like nearly every other element, at least has its double: hitherto we have had only the light headed top of the family. Chemistry is already too full of families; it is in need of a Marie Stopes rather than of an Aston. The discovery is the logical and necessary extension and corollary of the work of J. J., Aston and Co., yet J. J. was not mentioned, so short is memory.

As to heavy water, with all its Cambridge frills, it seems to be poor stuff compared with the real article—not so good a solvent; calculated to burst our pipes at a higher temperature than the common or garden article; apparently unfit for garden use, as it is inimical to life; not even worth mixing with whisky. Much as the cautious Scot has lost his head over his local monster, the newly recognised component of the Cam would seem to have more mightily disturbed the equanimity which commonly reigns in University circles. Some sense of proportion is desirable, even in neo-chemistry.

Fuel Research, 1932-33

Work of the Fuel Research Station More Widely Appreciated

THE Report of the Fuel Research Board for the year ended March 31, 1933 (H.M. Stationery Office, price 2s. 6d.) reviews the main investigations in progress at the Fuel Research Station and in the Survey Laboratories.

Experiments have continued on the cleaning of coal by the vacuum-flotation process and on the improvement of slurry settling tanks. A new process for the dry cleaning of coal designed in the South Yorkshire Coal Survey Laboratory is under investigation and shows considerable promise. Experiments on increasing the velocity of the heating gases in horizontal retorts have been continued and show the advantages and limitations of this method of increasing the throughput of the retorts. An investigation of the possibility of increasing the yield of gas in horizontal retorts by steaming is also in progress. The "Grid" burner designed at the Fuel Research Station has given promising results and is being developed, and progress has been made with the problem of stabilising dispersions of coal in oil. In regard to the hydrogenation of tar and coal, experiments have shown that the ease of hydrogenation of tar varies rapidly with the temperature of carbonisation over a critical range. Much of the plant of the larger scale unit has been erected, and experience with a unit dealing with 100 lb. of tar per day is being applied to the design of a unit with a daily throughput of one or two tons. Work on the constitution of coal has continued with the researches of Professor W. A. Bone and Mr. C. A. Seyler.

During the year the general policy and functions of the Fuel Research Board have been reviewed both by the Advisory Council and by the Board itself, together with the whole of the arrangements for the direction and conduct of the investigations of fuel problems. The prosperity of the country in the past, it is pointed out, has rested largely upon the use and sale of coal, one of our most important national assets. The scientific study of the utilisation of coal resources should, therefore, have for its objects not only the well-being of our great mining industry; it should also help to increase the competitive power of our manufacturing industries by lowering costs of production and increasing the efficiency of coal utilisation; and should make the country less dependent upon imported fuels.

Utilisation of Coal

The problem of the utilisation of coal presents so many aspects as to place the investigations beyond the scope of any single organisation. Much valuable work is being done on many of the problems by other organisations, and it is one of the primary duties of fuel treatment and utilisation under continuous review, and to see when the investigations in progress elsewhere require to be supplemented. There may be important fields of investigation for which the resources of other institutions are inadequate or unsuitable and which may thus be left unprovided for. The Fuel Research Station is available to deal with such cases as these and thus to secure the investigation of urgent fuel problems both fundamental and an applied nature.

The value of the work of the Board to the industry of the country depends largely on the interest taken by industrial undertakings in the progress of its investigations and on their readiness to bring to the notice of the Board any problems of major interest with which they are faced. It is therefore gratifying to learn that the resources of the Fuel Research Station are being used by industry to an increasing extent in this way. During the past year a number of inquiries has been undertaken as a result of problems which have been brought to the notice of the Board by industry. Among these may be mentioned the inquiry into the effect of storage upon the properties of coal, the investigation of mixtures of coal and oil ("colloidal" fuel), certain problems affecting the transport and distribution of coal in the pulverised form, and the utilisation of coal containing a low percentage of volatile matter.

As regards coke, the report shows that the new narrow brick retorts erected at the Fuel Research Station for the low-temperature carbonisation of coal have worked well. The coke produced has been found to be satisfactory as a free-burning domestic fuel. The retorts are being worked steadily to produce a stock of tar for tar-treatment experiments.

It has been found that certain tars produced by low-temperature carbonisation can be converted into motor spirit by a hydrogenation cracking process, with a yield of nearly 100 per cent. by volume with the elimination of tar and tar acids. Considerable progress has been made with the erection of a plant capable of dealing with 300 gallons of tar a day, designed to test the commercial possibilities of this process. Pending the completion of this plant, considerable information regarding the mechanism of the process is being obtained from work on small converters. Experiments have also been carried out with tars from different temperatures, and it has been found that as the temperature of carbonisation of the coal is increased the corresponding alteration in the quality of the tar produced decreases its suitability as a raw material for the hydrogenation-cracking process. In addition, the lower the oxygen content of the coal from which the tar is made, the more difficult becomes the treatment of that tar made at the higher temperatures of carbonisation, although at lower temperatures of carbonisation the difference between the tars from different coals is not so great.

Pulverised and Colloidal Fuel

A considerable amount of work has been done during the year on pulverised coal, which, the report states, has "for many purposes advantages in case of handling and control approaching those of oil fuel, while at present prices it is considerably cheaper." The main direction of the work at the Research Station has been towards the production of short-flame burners for pulverised fuel for use where the combustion space is limited, as, for example, on board ship. The "Grid" burner has already attracted considerable commercial interest on account of its flexibility in operation, its simplicity and cheapness. Another type in process of development employs the principle of the vortex ring to control the emission of the air and particles of fuel, so as to enable heat to be generated in a small space. A third type, known as the "Z" burner, is a very recent development, and will, if successful, it is stated, be a simpler form of burner than any yet tried. Other investigations summarised in the report deal with the sampling of powdered coal, the influence of the type of grinding mill and the type of coal on the structure and composition of the powdered coal and with the case of ignition of variouse types of coal-dust.

A mixture of finely-ground coal and fuel oil can, if stable, be used instead of fuel oil, as has been shown recently by the Cunard Company. Investigations on the conditions necessary to secure suspensions from which the coal will not settle out are in hand. The results given in the report show clearly that it is possible to produce extremely stable suspensions in the laboratory.

Coal Cleaning

The problem of coal cleaning is one which is receiving special attention at the Fuel Research Station. The work described in the current report deals mainly with the study of methods for the cleaning of fine coal. Considerable progress has been made with a dry cleaning process for this purpose designed at the Coal Survey Laboratory at Sheffield, and much attention has also been paid to methods for preventing waste of the water used in coal washeries by devising methods for hastening the settling of the fine coal and grit held in suspension in the water after leaving the washery. The report suggests, however, that apart from the cost of the cleaning it may be possible to make coal too clean. The different inorganic constituents of the coal are often removed in different proportions, and thus the fusion point of the ash may depend on the amount of cleaning carried out; the fusion point of the ash may be of more practical

importance than the actual amount of the ash. The mechanical stokers, now so generally used in large boiler plants, were originally designed to burn a small and not very clean coal, of which large quantities were available at a low price. If a very clean coal is used with such appliances, the grate may become over-heated owing to the absence of a protecting layer of ash.

Coal as a Chemical Raw Material

A study of the report shows that apart from the better utilisation of coal as fuel, a great deal of attention is now being devoted by the Board to the products derived from coal as possible raw materials for the chemical industry. For instance, it has been found that cresols from coal tar can be hydrogenated without pressure to produce toluene, which is not only a motor spirit, but an important product in the manufacture of dyestuffs and explosives. Again, the work on hydrogenation of coal itself, carried out at the Fuel Research Station, is now being mainly directed to the study of the constitution of coal and of the intermediate products formed during the process, rather than to its application as a means of producing motor spirit. Much work is recorded in the report on the effect of catalysts. One outstanding point which appears is the remarkably small amount of certain catalysts which may be needed. With some tin compounds the amount required is only 67 thousandths of 1 per cent. of the coal substance. The present report refers to the importance of taking into account the minute inorganic constituents of coal, and states that a spectroscopic examination is being made of the ashes of a number of coals selected on account of the facility or difficulty with which they may be hydrogenated. One object in view is to find coals containing the metal germanium, as this has been found to be one of the best catalysts.

In the last report it was shown that reproducible results from the hydrogenation-cracking of tars in the presence of catalysts can be obtained in the small converters only when the catalyst used is impregnated on a highly-porous material. From among a number of catalyst supports which have been tried, active charcoal, bauxite and alumina gel have been found to be the most effective. Experiments have been carried out with tars from different coals carbonised at different temperatures, and it has been found that as the temperature of carbonisation of the coal is increased the corresponding alteration in the quality of the tar produced decreases its suitability as a raw material for the hydrogenation-cracking process. In addition, the lower the oxygen content of the coal from which the tar is made, the more difficult becomes the treatment of that tar made at the higher temperatures of carbonisation, but at lower temperatures of carbonisation the difference between the tars from different coals is not so great.

Cracking Catalysts

The conclusions reached from a study of the hydrogenation-cracking of pure compounds have shown that in order to produce a maximum yield of spirit from tar it is not only necessary to have cracking reactions proceeding instantaneously with hydrogenation reactions, but that hydrogenation must proceed at least as rapidly as decomposition in order that the molecular fragments may be stabilised as soon as they are formed. If this is not the case, then the decomposition or cracking is followed by polymerisation of the fragments produced, with the ultimate formation of carbon or asphaltic material on the catalyst. This condition of sufficiently rapid hydrogenation is satisfied by the oxides and sulphides of molybdenum, which are very active hydrogenation catalysts.

An investigation is now being made to discover a suitable catalyst or mixture of catalysts. The experiments have been carried out in the two-litre converters, the temperature, initial hydrogen pressure and time of heating chosen being 450° C., 100 atmospheres, and 1 hour respectively. The choice of a suitable raw material presented some difficulty. It was desirable to use some mixture of compounds representative of tar, and yet tar itself is not suitable owing to the difficulty of interpreting the results obtained with such a material. With tar, so much low-boiling oil is produced from tar acids and other oxygenated compounds by reactions not involving cracking, that an increase in the production of light spirit cannot be interpreted to mean an increased cracking activity in the catalyst, but may mean an increased activity in hydrogenating or de-oxygenating. To overcome this difficulty, the material used was a "hydrogenated oil," i.e., a fraction (b.p. 200°-360° C.), free from tar acids, of the product frfom low-temperature tar subjected to an initial hydrogenation-cracking treatment in the presence of the molybdenum catalyst.

Experiments were first conducted with a powdered catalyst, but although 10 per cent. of catalyst was used, it was found that the results were not reproducible, probably owing to the varying surface offered by the same amount of catalyst in different experiments. A number of different powdered catalysts was, however, tried, and, although the results must be considered to be only approximate, it was found that the best cracking catalyst was an oxide or sulphide of molybdenum which had been activated by preheating. The use of powdered catalysts was abandoned and catalysts used thereafter were supported on alumina gel.

Fuel Oil from Low Temperature Tar

Most of the tar treatment experiments have been directed to the production of the maximum quantity of motor spirit, but in view of the growing importance of fuel oil miscible with petroleum oils, and Diesel oils, experiments have been carried out in an attempt to produce from tar the maximum quantity of fuel oil. By lowering the reaction temperature to 430° C., the whole of the pitch was converted into oil, i.e., the product was completely miscible with petroleum fuel oils; the yield of dry oil was 95.6 per cent. by weight (107 per cent. by volume), containing 10 per cent. of tar acids. The yield of neutral oil boiling above 200° C. was 65 per cent. by weight of the tar. It is possible that a lower reaction temperature could be used at which the pitch would still be converted into oil, but less tar acids would be converted, with a consequent diminition in the amount of motor spirit.

Up to the present the refined viscous oils obtained from hydrogenated low-temperature tar, although good lubricants at ordinary temperatures, are insufficiently stable at moderately high temperatures to be classed as good lubricating oils in general. Various catalysts have been used in attempts to hydrogenate the oil further, but it was found very difficult to effect anything like complete hydrogenation of the hydrocarbons present. Active nickel catalysts were "' poisoned" during the process, although the sulphur content of the oil was as low as 0.06 per cent. The most promising catalyst was found, as indicated by work on the hydrogenation of certain pure compounds, to be a mixture of sulphur and ammonium molybdate.

A Shilling Off the Income Tax

Taxpaying with Pleasure

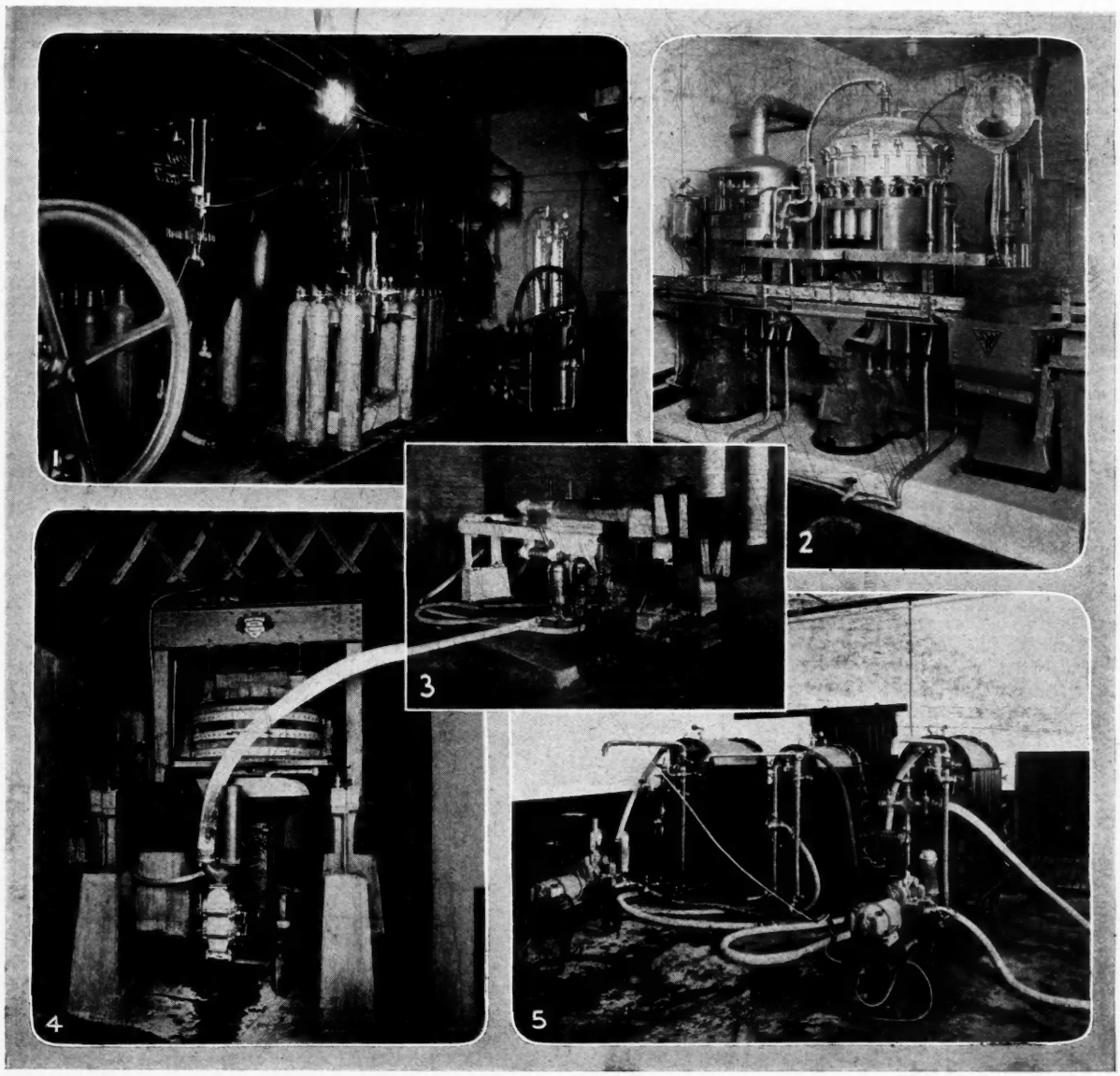
ACCORDING to a prediction in last week's issue of "The Independent," the taxpaying class has been writing its cheques this week in payment of the half-year's income-tax which became due last Monday with a sense of relief, if not indeed with pleasure. More hangs on this simple concession, so wisely made by the National Government, than appears upon the surface. The marked improvement in Christmas trade was in some measure due to the removal of the shadow of heavy taxation. When two years ago the exemption limit was lowered and large numbers of small incomes brought under tax, the effect upon Christmas trade was disastrous, thousands of new taxpayers curtailing their purchases to provide for the collectors' demands. The opposite movement has been noticeable this Christmas.

As "The Independent" has made clear, every penny of the Budget surplus, if in the end there proves to be one, will belong to the taxpayers whose income has been cut by Conversion schemes. Having regard to the marked improvement in Christmas trade, that is due to the minor concession which the Chancellor makes to-morrow, we hope he will remember when the Budget comes that the interests of the nation call for a full shilling off the rate of tax, and that even with the modest cuts the Civil Service is still relatively better off than the rest of us.

Grape Juice Bottling in South Africa

An Enterprise of the Co-operative Wine Growers' Association

A NOTABLE development in the technique of producing non-alcoholic grape juice has recently reached maturity in the factory erected by the Co-operative Wine Growers' Association at Worcester, South Africa. This factory was officially opened, although active production had already been going on for five months, on May 29, 1933, by the Governor-General of South Africa, the Earl of Clarendon. The process adopted is the well-known one of cold sterilisation by the use of the Seitz' "EK" sterilising filter and practically the whole of the plant has been installed by Seitz-Works, G.m.b.H., who are represented in this country by John C. Carlson, of London. In actual point of fact, Dr. Schmitthenner (Seitz Works), who has carried out all the pioneer work on this process, visited South Africa to discuss with the Wine Growers' Association all details as to the site, plant, production, etc.



(1) Grape juice passes through its final process in these 11,000 gallon ebon-lined steel tanks ; here the juice, impregnated with carbon dioxide, is stored for two months at a temperature of 52° F. before being bottled. (2) The juice is sterilised, bottled, corked and labelled at the rate of 2,400 to 3,000 bottles per hour ; an endless moving chain carries the bottles through the different processes. (3) Calcium chloride, continually flowing through the veins of this pre-cooling plant, reduces the normal temperature of the grape juice to 32° F. before passing it to the cold chambers. (4) A view of the egrappoirs and hydraulic press ; the juice from the crushed grapes percolates through wooden sieves in the slanting floor of the cement tanks before being pumped to the pre-cooling plant. (5) The fining room where the grape juice is pumped through filters to obtain "brilliance" ; from here it returns to the cold storage chambers.

The ripe grapes coming from the vineyards are pressed in the normal type of grape press as used throughout the world. After the press, the grape juice runs into a pre-cooling plant and then into cold storage tanks. The cold storage

tanks are constructed in reinforced concrete and have 20 leaguers capacity. In these the juice is held at a temperature of 28° F. and this is sufficient to hold over the fermentation whilst the preliminary clarification is effected. The cold store is maintained at the low temperature by means of a 25 tons 2-cylinder compressor equipped with a 60 h.p. motor.

Preliminary Clarification

In the cold storage tanks the preliminary clarification is effected by means of fining with tannin and gelatine. The tannin and gelatine are added to the grape juice in the requisite amounts and this brings about a very considerable clearing of the grape juice in 24-48 hours. The juice is then racked off and rendered brilliant by filtration through a battery of Seitz' " Hercules " filters, which are set by Seitz' Volta pumps. The operation of these filters is simple and the maintenance costs low. The filtration is effected by means of asbestos filtering materials which are alluviated on to fine wire gauzes, arranged vertically in the form of double-sided filtering elements in the filter case, so forming thin filtering layers. The filtering effect is very sharp, but owing to the peculiar composition of the filtering layer an extraordinary large hourly and total output is obtained. After the first process of precoating to form a filtering layer has been effected, the filtration is carried out by gravity, the filter being fed by a tank situated about 15 feet above the filter inlet.

The brilliant juice so obtained is then subjected to a maturation period of 3-6 months. In order to prevent the onset of fermentation, the juice is stored under a high pressure of carbon dioxide, namely, 120 lb. per sq. in. For this purpose specially constructed tanks each with a capacity of 11,000 gallons are used. Thirty such tanks have been installed. The tanks are charged with carbon dioxide until a pressure of 120 lb. per sq. in. is shown. The juice is then passed into the tanks via impregnating pumps, which saturate it with carbon dioxide at a pressure of 120 lb. per sq. in. As mentioned above, the juice is stored in these tanks for periods varying between 3 and 6 months, during which time maturation takes place and certain constituents of the juice are rendered insoluble.

Bottle Washing and Sterilising

After this maturation period the juice is decarbonated prior to the bottling process. The bottling process may truly be described as a triumph of modern scientific technique. The bottles are first washed on a Seitz' bottle washing machine, with an output of 250 dozen per hour. This machine combines both the soaking and spraying principles on which modern bottle washers now operate. The feed and discharge are situated at the same end of the machine. The bottles enter the machine and pass down into the lower compartment where they are subjected to a preliminary soaking in warm water and an intensive soaking with alkali. After the alkali soak, the bottles are emptied and receive a double "swamping" wash with hot alkali, before commencing the return journey in the upper part of the machine. In this part of the machine they are subjected to a series of internal and external sprayings under high pressure with alkali, hot water and cold water and finally drained a minute or so before reaching the discharge of the machine.

From the bottle washing machine the bottles pass on a transport band to the Seitz' filling unit. The first process is the sterilisation of the bottles and this is carried out on a special machine. The bottle sterilising machine is somewhat similar in construction to a bottle filling machine. The actual sterilisation is effected by gaseous sulphur dioxide. During the passage round the first half of the machine, bottles are subjected to a treatment with sulphur dioxide. The pure sulphur dioxide enters at the half-way position and then by a bridge device from bottle to bottle, becoming more and more dilute in each bottle until it reaches the first bottle on the machine and from there passes to exhaust. If a bottle is missing, there is a special arrangement to ensure that the sulphur dioxide does not escape, but is bridged over to the next bottle.

In the second half of the machine the bottles are blown out with sterile air, the sterile air being obtained by passing dry, oil-free air through a Seitz' " EK " air sterilising filter. Here again the counter-current principle is adopted, the supply of sterile air entering the last bottle just before leaving the machine and the exhaust being drawn off from the half-way position, where the bottles have just been treated with 100 per cent. sulphur dioxide. The whole of the upper part of the machine is enclosed and connected to a gas ventilator, so that the fumes of sulphur dioxide do not enter the atmosphere of the room.

From the bottle steriliser the bottles return to a transport band and are carried on to the filling machine and ultimately to the crown corking machine. The transport bands between these three machines are covered with an inverted " U " shape protecting cap, so that no germs can enter the bottles from the atmosphere. Both the filling machine and the crown corker are specially constructed so as to work under sterile conditions. The filling is carried out under counter-pressure. The crown corks must also be sterilised and for this purpose they are treated with formaldehyde gas in canvas bags, as this has been found the most efficacious means. Prior to filling on this unit it is, of course, essential that the machines themselves be sterilised. This is carried out by means of steam which is passed through the whole unit for 30 minutes.

The Sterilisation of the Juice

The grape juice itself is sterilised by filtration through the Seitz' " EK " sterilising filter. The filter operates with ready-made asbestos filtering films, which are so fine in their filtering properties that all yeasts and bacteria are completely eliminated from any liquid filtered through them. The filter is somewhat similar in its construction to a filter press, the filtering films being placed in position between a series of filtering chambers, and the whole sterilised by passage of steam. The grape juice is forced through this filter under pressure of 15-20 lb. per sq. in. and leaves the filter in a brilliant and sterile condition and passes hence direct into the sterile filling machine outlined above.

Although this is the first factory to undertake the production of non-alcoholic grape juice on such a large scale and making use of an automatic plant, many others on a smaller scale are in operation in the wine and fruit growing countries throughout the world. It is understood that projects are now under consideration for the production of non-alcoholic apple juice by a similar process in England. Research work of a very exhaustive nature has already been carried out by the Cider Institute, Long Ashton, and some of the results are contained in their last annual report.

New Year Honours

Knighthood for Alderman Thomas Keens

THE New Year Honours List published on Monday included a knighthood for Alderman Thomas Keens, a director of B. Laporte, Ltd., Luton, who, in 1916, was chosen by various blanc fixe manufacturers to form the organisation known as Blanc Fixe Manufacturers, Ltd., and to act as its governing director. Sir Thomas Keens is a Deputy Lieutenant for Bedfordshire and a county alderman, having been chairman of the Bedfordshire Finance Committee for many years. He is an ex-president of the Incorporated Accountants and the Society of Incorporated Accountants and also ex-president of the Society of Accountants and Auditors. He was member of Parliament for the Aylesbury Division in 1923-24. He has also for many years been closely associated with the Chambers of Commerce in Great Britain, and has been hon. secretary of the Luton Chamber for about a quarter of a century.

Other awards in the New Year Honours list were as follows: Kenneth Lee, LL.D., chairman of Tootal Broadhurst Lee Co., Ltd., of Manchester, chairman of the Industrial Grants Committee, Department of Scientific and Industrial Research, and a member of many Government committees (Knighthood). Clarence Hamilton Creasey, Board of Education Inspector of Instruction in Chemistry (O.B.E.). Thomas Dalmahoy Barlow, chairman of the Lancashire Industrial Development Council, lately president of the Joint Committee of Cotton Trade Organisations and of the Manchester Chamber of Commerce (K.B.E.). Sir Richard Tetley Glazebrook (K.C.V.O.).

Financial Position in the Chemical Industry

By S. HOWARD WITHEY, F.C.I.

MANUFACTURERS of explosive and chemical products have been able to maintain profits and dividends, and in the case of Explosives and Chemical Products, Ltd., the balance of net profit for the financial year to the end of June last, worked out at £11,916, which figure compares with £11,443 realised during the preceding twelve months. Registered in 1905, this company increased its share capital from £50,000 to £100,000 in 1926, divided into £95,000 ordinary shares, and £5,000 deferred shares, and as in 1931-32 the ordinary shareholders received a dividend of 16⅜ per cent., tax free, and the deferred shareholders a dividend of 6.0717d. per 1s. share, tax free, leaving a credit balance of £22,204 to go forward to the next account, as against £20,461 brought in.

The manufacture and sale of sulphuric acid and other chemicals used in the textile trades and for agricultural purposes has not been very profitable, and after providing for depreciation of wasting assets, some companies found themselves faced with a heavy deficit on revenue account. During the twelve months to the end of March, the Eastern Chemical Co., Ltd., sustained a loss of £7,148, this figure being arrived at after allowing the sum of £4,015 for depreciation, thereby increasing the debit balance to £46,636 on a called-up capital of £100,000, the latter comprising £99,000 in the form of 10 per cent. non-cumulative participating ordinary shares of £1, and £1,000 in deferred shares of 2s. each. On November 20, a meeting of debenture holders of Fison, Packard and Prentice, Ltd., was held for the purpose of considering resolutions providing for an increase in the rate of interest from 4¼ per cent. to 4½ per cent., and for the postponement of redemption from 1945 to 1964, when the debentures will be repayable at 101½ per cent.

Rubber Manufacturers

Rubber manufacturers report satisfactory results and view the outlook with a greater degree of confidence than was possible a year ago. In March, the Avon India Rubber Co., Ltd., was converted into a public company, and during the financial year to the end of September realised a gross profit of £80,543. After debiting interest, fees, and depreciation, and transferring £3,773 from tax reserve not required, the audited account revealed a net profit of £40,577, which compares with £46,593 realised during the preceding twelve months. The authorised capital is £375,000, and at the balancing date a total of £321,842 ranked for dividend, composed of £25,000 in the form of 6 per cent. cumulative preference £1 shares, and £296,842 in ordinary £1 shares. The rate of ordinary dividend was raised from 6 per cent. to 8 per cent., and as no special transfer was made to reserve the carry forward was increased from £12,252 to £27,750. During the same accounting period, the Hermetic Rubber Co., Ltd., made a net profit of £2,537, enabling a dividend of 12½ per cent. to be paid, and £2,500 to be transferred to reserve, leaving a credit balance of £1,633 to be carried forward to the 1933-34 account, as against £5,991 brought in from 1931-32. This company was registered in 1895, and has an authorised share capital of £25,000, all of which has been subscribed and paid up in the form of 10s. shares of one class. On the other hand, a net loss of £7,842 was sustained by the Trowbridge Tyre and Rubber Co. (1929), Ltd., which had the effect of increasing the revenue deficit to £82,314, representing about one-half of the total paid up capital. The Dunlop Rubber conversion scheme will enable a saving of £100,000 to be effected in interest charges, and will strengthen the security of the preference share capital and improve the prospects in the matter of ordinary dividend. A reduction of the capital of the India Rubber, Gutta Percha and Telegraph Works Co., Ltd., has been sanctioned by the Court, and voting control will be exercised by the British Goodrich Rubber Company. The 1932 accounts of Indeuram, Ltd.—producers of mica, rubber, asbestos, etc.—were submitted in November, disclosing a loss of £1,431, which increases the debit balance to £4,188.

The cement trade has been handicapped by the slowing down of public works, and by acute competition, and profit margins show a downward tendency. The gross profit of £14,980 made by Eastwoods Lewes Cement, Ltd., during the financial year ended June 30 last, compares unfavourably with £19,921 shown in the previous account, and after charging depreciation, income tax, general expenses and fees, the balance of net profit worked out at £7,645, or a reduction of £4,613 in relation to the 1931-32 figure. As a result, the dividend was reduced from 10 per cent. to 7½ per cent., and a smaller balance carried forward to the next account. The majority of firms who specialise in large-scale reinforcement and structural work report smaller profits, and the final figures submitted by the François Cementation Co., Ltd., covering the operations for the twelve months to the end of March, revealed a reduction of profit from £9,420 to £6,881, before charging £6,000 for debenture redemption, necessitating the payment of only six months' dividend on the preference shares at the expense of the carry forward. This company was registered in 1919, and has an authorised share capital of £750,000, of which a total of £310,000 has been issued and paid up, consisting of £250,000 in the form of 8 per cent. cumulative preference £1 shares, and £60,000 in ordinary shares of 1s. denomination.

Drugs and Proprietary Medicines

The report of Taylors Drug Co., Ltd., was satisfactory, the gross profit for the financial year to September 30 last being shown at £59,993, or an increase of £7,792 when compared with the previous year's figure. After debiting income tax and depreciation—both of which were larger than in the preceding year—the balance of net profit was £35,224, as compared with £33,677, the ordinary dividend being consequently raised from 6⅛ per cent. to 6½ per cent. and an increased balance carried forward to the next account. Registered in 1888, this company has 210 branches operating mainly in the North, and is controlled by Taylors (Cash Chemists) Trust, Ltd., the authorised share capital being £600,000, all of which ranked for dividend, comprising £100,000 in the form of 6 per cent. cumulative preference shares; £200,000 is 7 per cent. "A" cumulative preference shares; and £300,000 in ordinary shares, all of £1. The 6 per cent. preference shares were recently quoted at 21s., and the 7 per cents. at 23s. The first accounts of National Drug Industries, Ltd., covering the operations during the thirteen months to the end of March last, were submitted in October, showing a net profit of £2,601, enabling the preference dividend to be met, the balance being carried forward. The authorised share capital of this company is £80,000, divided into £39,750 6 per cent. participating preference £1 shares; £39,750 ordinary £1 shares; and £500 deferred shares of 1s. denomination.

Including dividends received from subsidiaries, and after deducting interest and administration expenses, a profit of £201,504 was made by Timothy Whites (1928), Ltd. during the twelve months ended September 30 last, representing an increase of £15,241 in relation to the 1931-32 figure. The balance of net profit proved to be £136,937, as compared with £118,753 shown in the previous account, enabling the dividend on the deferred shares to be raised from 10 per cent. to 15 per cent., and an increased balance to be carried forward. The capital ranking for dividends consists of £1,676,000 in the form of 7½ per cent. cumulative preferred ordinary £1 shares—the dividend on which takes £94,275—and £323,800 in deferred shares of 1s. denomination—the dividend on which absorbs £36,427, and recently the preferred were quoted at 28s. and the deferred at 3s.

Non-Ferrous Metals

The depression in metals was reflected in the figures submitted by the Imperial Smelting Corporation, Ltd., which owns the entire share capital of the National Smelting Co., Ltd. and Non-Ferrous Metal Products, Ltd., and a controlling interest in Fricker's Metal and Chemical Co., Ltd. The audited accounts were made up to the end of June, and

whereas dividend income plus interest on investments aggregated £137,189, or an increase of £18,355, no profit was realised on exchange, with the result that after debiting administration expenses and directors' fees the balance of profit was £129,880, as compared with £137,472 realised during the preceding twelve months. The authorised share capital is £7,500,000, but only a total of £4,494,766 was issued at the balancing date, consisting of £2,069,809 in the form of 6½ per cent. cumulative preference £1 shares—the dividend on which absorbed £134,538—and £2,424,957 in ordinary £1 shares, which have received no dividend since 1930, when 5 per cent. was distributed. During the same financial period, a gross profit of £506,034 was made by United Steel Companies, Ltd., this being a substantial improvement in relation to £330,289 made in 1931-32, and after debiting income-tax and other charges the net figure was £351,438, or an increase of no less than £164,084. The depreciation reserve received an allocation of £250,000, bringing that fund up to £625,000, the carry forward being then increased from £128,942 to £230,380. The company has effected considerable improvements in organisation, and a further expansion of profits is anticipated. The final figures of the Birmingham Aluminium Casting (1903) Co., Ltd., were balanced as at July 31, and disclosed a net profit of £18,504, which compares favourably with the net profit of £15,129 realised during the previous year, and enabled the rate of ordinary dividend to be raised from 5 per cent. to 7½ per cent., and £5,000 to be transferred to depreciation reserve, leaving a credit balance of £27,341 to go forward to the 1933-34 account, as against £29,294 brought in from 1931-32. On the other hand, a net loss of £12,104 was sustained by Lightalloys, Ltd.—aluminium alloy founders and engineers—during the fifty-three weeks ended July 2, which compares very unfavourably with the net profit of £16,944 realised during the preceding financial period, and converted a credit balance into a debit of £467. This company was registered privately in 1926, and converted into a public company in 1929, the authorised share capital being £100,000 in the form of ordinary shares of 5s.

Tar and Benzol

Benzol and By-Products, Ltd., reported a net loss of £4,270, and after transferring £1,014 from taxation reserve not required the account showed a debit balance of £126,831, which was carried forward. In the case of Midland Tar Distilleries, Ltd., which controls Josiah Hardman, Ltd., the balance of profit for the year to the end of June last proved to be £33,252, enabling a final dividend of 2½ per cent. to be declared on the ordinary shares, making 5 per cent. for the year, as before, and although no special allocation was made to the investment reserve, the general reserve was increased by £9,835, and a transfer of £10,000 was made to the contingency reserve, the carry forward then showing a reduction of £11,203 at £18,602. During the same period a net profit of £102 was realised by Sadler and Co., Ltd., and although this compared unfavourably with the net profit of £4,920 disclosed in the 1931-32 account, the dividend of 5 per cent. was repeated for the fourth successive year after transferring £4,240 from the taxation and contingencies reserve. This company was registered in 1883, and has an authorised capital of £425,000.

Dyeing Trades

At September 30, 1932, the profit and loss account of the British Cotton and Wool Dyers' Association, Ltd., showed a credit balance of £61,120, but this has now been reduced to £57,113, the net profit for the six months ended September 30, being shown in the half-yearly statement at 21,394, as compared with £28,452. The amalgamation includes numerous businesses engaged in dyeing and bleaching, etc., the authorised share capital being £1,000,000 in shares of 5s.. The profit of £5,477 realised by Simpson and Godlee, Ltd.—the Manchester cotton manufacturers and calico printers—during the year to September, compares with £12,557 made in 1931-32, and after meeting the dividend on the preference shares, as beffore, there remains a credit balance of £96,596 to go forward to 1933-34, as against a credit of £108,621 brought in. Registered in 1899, the company controls the Know Mill Printing Co. Ltd., and has an authorised share capital of £550,000, divided into £250,000 7 per cent. cumulative preference £1 shares, and £300,000 ordinary shares of £1 which have received no dividend since 1928-29, when 10 per cent. was distributed.

A further improvement in gross profit was reported by Wall Paper Manufacturers, Ltd., the audited account covering the twelve months' operations to the end of August showing a balance of £635,055, which figure compares with £608,148 shown in the 1931-32 account. Since 1899 the company has acquired several concerns, and now owns the entire share capital of the Walpamur Co., Ltd. and of Arthur Sanderson and Sons, Ltd. The declaration of a final dividend of 7½ per cent. on the deferred shares makes 11½ per cent. for the year, as compared with 10 per cent. for 1931-32, and after allocating £10,000 to the staff funds, and reducing the book value of goodwill patents, etc., by £98,815, there remains a credit balance of £261,417 to go forward, as against £263,991 brought forward.

Fertilisers

Phosphate of lime merchants have been able to maintain profits during the past year, and the report of the Anglo-French Phosphate Co., Ltd., disclosed a net profit £26,853, enabling the dividend of 8 per cent. to be repeated, plus a bonus of 2½ per cent., as compared with a bonus of 5 per cent. previously distributed. The entire authorised share capital of this company has been issued and paid up, and after allocating £15,000 to the reserve there remained a credit balance of £20,062 to be carried forward, as against £27,896 brought in. Lawes' Chemical Manure Co., Ltd., realised a net profit of £6,075 during the financial year to June 30, this figure representing an increase of £2,759 in relation to the previous year's net profit, enabling a dividend of 2½ per cent to be paid on the ordinary shares, and an increased balance to be carried forward to the next account.

The report of the British Cyanides Co., Ltd., reflected an active trade in chemicals, and a further expansion in the demand for the company's products. During the twelve months to the end of June, a gross profit of £47,507 was realised, which compares favourably with £35,137 made in 1931-32, and after debiting special obsolescence and subsidiary advertising costs, and reducing the book value of Birmingham plant by £4,412, the balance of net profit worked out at £12,725, representing an increase of about 27 per cent. Registered in 1904, the company holds the entire issued share capital of several companies, including Beetle Products, Ltd., and the Streetley Manufacturing Co., Ltd., and of an authorised share capital of £450,000, a total of £325,956 has been issued and paid up, comprising £14,820 in 10 per cent. cumulative preference shares, and £311,136 in ordinary shares all of 2s. In February last, an interim dividend of 3 per cent. was paid on the ordinary shares, and after meeting the percentage payable to the Rock Investment Co., and transferring £5,000 to reserve—bringing that fund up to £30,000—the final profit and loss account shows a credit balance of £2,573 to be carried forward to 1933-34.

The following interim dividends have been announced:—William Blyth and Co., Ltd. (chemical manufacturers): Interim dividend of 3 per cent. on ordinary capital of £132,600 A Boake, Roberts and Co., Ltd. (manufacturing chemists): Interim dividend of 2 per cent. tax free. British Match Corporation, Ltd.: Interim dividend of 2 per cent. tax free. Dubarry Perfumery Co., Ltd. (manufacturing chemists, and manufacturers of fine toilet soaps, perfumery and toilet luxuries): Interim dividend of 5 per cent. A. B. Fleming and Co., Ltd. (printing ink and chemical manufacturers): Interim dividend of 5 per cent.

Hungarian Aluminium and Beryllium

As a result of the progressive decline in bauxite exports, from 235,000 tons in 1927 to 68,000 tons in 1932, plans are being mooted for producing aluminium metal at two centres, reports the "Chemische Industrie," November 4. At one of the projected plants—on the island of Cseped to the south of Budapest—it is also proposed to manufacture metallic beryllium on a large scale. Special significance is attached to the latter development which it is hoped will eventually cut down imports of zinc, tin, nickel and other metals.

The Action of Solvents on Coal

A Contribution to Knowledge on the Constitution of Coal

In this article Dr. G. E. Foxwell, D.Sc., F.Inst.P., F.Inst. F., M.Inst. Gas Eng., reviews a recent publication of the Fuel Research Board on the action o solvents on coal.

MUCH work has been done on the action of solvents on coal with a view to obtaining an insight into its constitution. Although the literature on the subject is extensive, different investigators have used different solvents, different technique and different coals; the consequence is that the results have often appeared to be contradictory. In their latest publication, "The Action of Solvents on Coal," by Dr. W. E. Bakes, the Fuel Research Board (Technical Paper No. 37, H.H. Stationery Office, price 4s. 6d.) have summarised published literature on the subject, and have given a detailed account of similar or complimentary experiments conducted by themselves. The investigation of the constitution of coal has many aspects; it is, for example, one of the most intriguing problems that can be put before the organic chemist, and is perhaps all the more so because a true picture cannot be obtained unless the organic chemist collaborates with the palæobotanist; it throws a vivid light on the process of coal carbonisation—an industry which uses nearly 40,000,000 tons of coal a year, and in regard to which so many of the products are of vital interest to the chemical manufacturer; finally, a knowledge of the composition of the coal must lead to a better understanding and, therefore, to more efficient practice in every use to which coal is put. Among the important uses of coal is hydrogenation, which the chemical industry seems now to have definitely taken under its wing.

The principal solvents used for the examination of coal are benzene (under pressure and at a temperature of 285° C.) and pyridine, used under atmospheric pressure at its boiling point. There have always been doubts whether either of these liquids is a solvent in the true sense of the term, and the Fuel Research Board reaches the conclusion that some form of chemical action occurs. With benzene this chemical action is likely to be that of decomposition, whereas pyridine acts as a peptising agent. The view of Tideswell that the action of pyridine should be compared with the loosening of a colloid mass, leaving the more precise nature of this "unbuilding" an open question, is probably as far as we can go in the present state of our knowledge. It is certainly both interesting and important to observe how greatly the proportion of coal that is soluble increases when the coal is preheated to temperatures of the order of 250° to 350° C.; light is thrown upon this by the F.R.B.'s experiments on the partial hydrogenation of coal, which are discussed later.

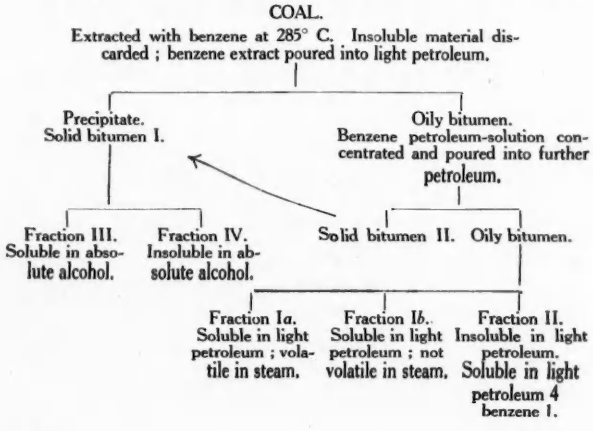
Action of Benzene and Pyridine

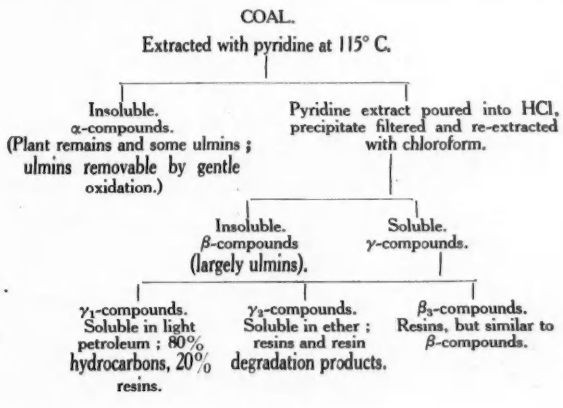
The two methods now in most general use for the investigation of coal by solvents may be summarised diagrammatically as shown below. In studying these diagrams it is as well to remember that all investigators appear to have had as their objective the extraction from the coal of a constituent of unknown composition and nature which was supposed to give to the coal by its mere presence the quality of "coking."

The confusion that exists is well illustrated by the views of the principal investigators who use benzene as a solvent. Fischer and his co-workers conclude that the oily bitumen imparts the power of coking to coals, whilst the solid bitumen causes the swelling of the coal during carbonisation. Bone, however, believes that the oily bitumen plays but a small part in the coking process, and that it is the solid bitumen which is really the binding agent; he states that fraction I is always quite devoid of binding properties; fraction II is sometimes, but not always, an agglutinant, while fractions III and IV always possess strong binding properties, and, since the former is usually present in quite small amounts, it is the latter which may rightly be regarded as the caking constituent. Wheeler and his co-workers have concluded that so far as the presence of a coking principle is necessary for the production of a good commercial coke, this is provided by the resins and hydrocarbons contained in the coal or is produced from these substances during the early stages of heating in the coke-oven.

Following the description of the work of many investigators who have attacked coal with solvents, the Fuel Research Board refers in considerable detail to the present writer's theory of coking, and agree that coking is primarily a physical process and that whilst in this process the bitumens or γ-compounds play an essential part, the power to form coke is not conditioned solely or even largely by the percentage of these bodies that happens to be present. The experiments carried out by the Fuel Research Board themselves further confirm these views. It is perhaps unfortunate that they were not able to take into account the present writer's more recent extension of his work upon the coking power of coals, wherein a fundamentally important rôle is attributed to pressure generated in the interior of the particles of coal in spreading the fluid matter over the inert particles, the surface of which is then partially dissolved or dispersed by the fluid material.

The Fuel Research Board considers that pyridine is a more convenient solvent than benzene, although both are primarily of use for research purposes only. Neither solvent seems to be satisfactory in extracting the whole of the coke-forming constituent, since a large proportion of the "groupings" which contribute to tar formation are not extracted either by pressure-benzene or pyridine. The determining factor as regards the efficiency of pyridine appears to be the presence of


COAL.
Extracted with benzene at 285° C. Insoluble material discarded ; benzene extract poured into light petroleum.
Precipitate. Solid bitumen I.
Oily bitumen. Benzene petroleum-solution concentrated and poured into further petroleum.
Fraction III. Soluble in absolute alcohol.
Fraction IV. Insoluble in absolute alcohol.
Solid bitumen II.
Oily bitumen.
Fraction Ia. Soluble in light petroleum ; volatile in steam.
Fraction Ib. Soluble in light petroleum ; not volatile in steam.
Fraction II. Insoluble in light petroleum. Soluble in light petroleum 4 benzene 1.


COAL.
Extracted with pyridine at 115° C.
Insoluble. α-compounds. (Plant remains and some ulmins ; ulmins removable by gentle oxidation.)
Pyridine extract poured into HCl, precipitate filtered and re-extracted with chloroform.
Insoluble. β-compounds (largely ulmins).
Soluble. γ-compounds.
γ1-compounds. Soluble in light petroleum ; 80% hydrocarbons, 20% resins.
γ2-compounds. Soluble in ether ; resins and resin degradation products.
β3-compounds. Resins, but similar to β-compounds.

moisture. Quite small percentages of water in either the pyridine or the coal greatly reduce the solvent action of pyridine, particularly with respect to the β fractions. It is, for example, necessary to dry even the extraction thimbles in a vacuum oven before use, or the 4 to 6 per cent. of absorbed moisture contained in them will reduce the yield of extract obtained.

More Detailed Investigation Needed

So uncertain is the solvent method as used up to the present, that there is no definite evidence that any fraction from any extraction (benzene, pyridine or other solvent) consists of compounds of one type only. Indeed, the method of arriving at the different fractions precludes the possibility, and no argument as regards chemical structure can be based on the solubility or insolubility of any part of an extract in one particular solvent. It is probably quite accidental that the various substances appear in particular fractions. Until a more precise knowledge of the constituents of the fractions is obtained, therefore, their homogeneity must remain in doubt. The general conclusion to be drawn is that caking and swelling are no doubt the result of a combination of physical and chemical reactions which take place partly simultaneously and partly successively. During the plastic stage two types of plastic material may be present. The first (the caking constituent) consists of a dispersion or solution of the solid chloroform-soluble fractions (fractions III and IV, or γ_2— and γ_3) in the liquid fractions (fractions I, or γ_1). This solution has a comparatively low viscosity and, provided the surface of the infusible portions of the coal is in the correct condition, becomes more or less evenly distributed throughout the whole of the coal substance before its decomposition becomes appreciable. The present writer would put far less stress on the condition of the surface and holds that fluid matter is forced into the proper place by the internal pressure. The second type of plastic material (the swelling constituent) results from the fusion of portions of coal similar in nature to the β fractions which may be obtained by pyridine extraction. The viscosity of this second type is sufficiently high to withstand a considerable gas pressure, and in consequence large gas bubbles are imprisoned in the plastic mass, this giving rise to the pressure just postulated.

In the concluding section of their work, the Fuel Research Board have adapted their studies of the action of solvents on coal to the partial and complete hydrogenation of a selected coal, and they have considerably clarified our ideas on the chemistry of carbonisation. As the result of this work it is concluded that neither benzene nor pyridine exercises only a solvent action when used for the extraction of coals. The molecules composing coal are considered as consisting of external groupings or side chains around a nucleus. During extraction a mild form of cracking appears to occur during which external groupings are removed from the coal molecules, leaving the nuclei more or less intact. Thus the saturated hydrocarbons which appear as one of the earliest decomposition—or distillation—products, are formed very largely from these external groupings. The hydrogen, which does not appeapr until after the plastic stage in any quantity in the normal course of carbonisation, is formed by the dehydrogenation of the nucleus.

Partial and Complete Hydrogenation

This view is supported by the experimental fact that when the outer groupings have been removed and the nuclei have been left in a more exposed state, hydrogen makes its appearance earlier during the progress of carbonisation. It is also an interesting suggestion that, since the tar is evolved during the earlier stages of carbonisation, it originates in the external groupings; it is, in point of fact, found to diminish in quantity when these external groupings have been removed, as for example by partial hydrogenation, which is the first action of hydrogenation. It follows that since the fluid matter which in carbonisation performs the necessary rôle of providing an envelope to enable a sufficiently high internal pressure to be maintained and of cementing the particles together, is formed from the external groupings of the coal molecule, it may not exist as such in the coal even to the smallest extent. It is indeed probably formed in the earlier stages of heating prior to the plastic stage. The writer believes that this view finds support in many directions; for example, although the melting point of the γ compounds is not greatly above 100°C., and in some instances is below that temperature, there is no real evidence of any molten matter in coal even at temperatures as high as 200°C. Support is also given by the increased amount of coal extractable by solvents after preheating. It is, therefore, hardly surprising that work using solvents has not elucidated the cause of coke formation and that the proportion of the bodies extracted by solvents bears no definite relation to the coking power of coal.

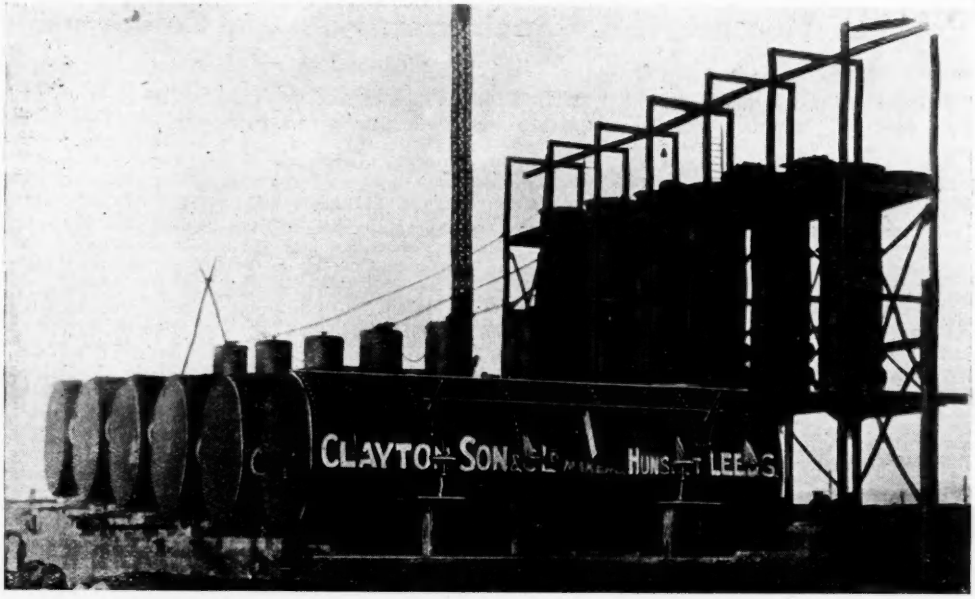
Chemical Engineering Congress

Prince George to Become Patron

SOME three years ago an informal committee, under the chairmanship of the late Sir Frederic Nathan, met to discuss the desirability of a permanent international organisation to promote the study of chemical engineering problems and to provide means for the interchange of views and experience between chemical engineers. The many aspects of the suggestion were discussed at a series of meetings of the committee, and it was eventually decided, in order to avoid the creation of a further international body, to seek the co-operation of the World Power Conference, the international position and prestige of which would be of the greatest assistance. The Council of the Institution of Chemical Engineers was asked at this stage to express an opinion on these proposals, and its cordial support was given. In due course the World Power Conference signified its agreement to a chemical engineering congress being held under its ægis and a provisional committee was formed to bring this into effect. After further organising work of a preliminary character, an inaugural meeting was held at Unilever House in July last with the president of the Institution in the chair.

The Quarterly Bulletin of the Institution of Chemical Engineers issued this week announces that the scheme is now formerly launched. H.R.H. Prince George has kindly consented to act as patron of the congress, the necessary subcommittees have been set up, and the work of organisation is making progress. The Institution is well represented in this connection, among the appointments made being:—President of the Congress, Viscount Leverhulme; vice-presidents, the president of the Institution at the time of the congress and Sir Robert Hadfield, Bart.; representatives on Grand Council, Mr. W. Macnab (who has been nominated for election as president of the Institution next month): members of organising committee, Dr. E. W. Smith (vice-chairman), Mr. W. A. S. Calder, Mr. H. W. Cremer, Sir Alexander Gibb, Mr. George Gray, Mr. F. A. Greene, Mr. W. Macnab, Dr. W. R. Ormandy, Mr. J. Davidson Pratt, Mr. J. Arthur Reavell, Dr. F. S. Sinnatt, Mr. H. Talbot; technical sub-committee, Mr. W. A. S. Calder (chairman), Dr. F. S. Sinnatt (vice-chairman; finance sub-committee, Mr. J. Davidson Pratt (hon. treasurer and chairman of committee; sub-committee on hospitality, Sir Alexander Gibb (chairman).

The foregoing is a brief outline of what has been done. The congress will probably be held in the autumn of 1935 or the early part of 1936, and it is anticipated that a summary of the position to date will shortly be issued to the Press.



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Association of Tar Distillers

Work on the Corrosion of Stills

THE Association of Tar Distillers, which is affiliated with the Association of British Chemical Manufacturers, and works in close co-operation with its Group V (tar distilling group), has had another busy year. Special attention has been given to the important problem of the corrosion of tar stills. A careful analysis of the voluminous data collected from tar distillers all over the country regarding their experience in the corrosion of stills did not give any clear lead as to the direction in which a solution of the problem might be found. After consultation with the Chemical Research Laboratory of the Department of Scientific and Industrial Research, which has had considerable experience of the analysis of tars and of corrosion problems, and with the Chief Alkali Inspector, whose department has been conducting investigations on this subject, the Tar Stills Corrosion Sub-Committee of the Association of Tar Distillers came to the conclusion that a scientific scheme of research was required, involving the separation of different types of tars into their constituents, and the determination of the corrosive action and behaviour of these constituents on distillation.

A scheme of work has been approved, and the Association is now considering a proposal for conducting the investigations in collaboration with the Department of Scientific and Industrial Research. During the course of this work on corrosion, consideration will be given to the problem of dealing with the dangers arising in certain types of stills from the formation of a product, thought to be iron sulphide, which gives rise to spontaneous combustion on opening up the still. If the formation of this material cannot be prevented, the difficulty will have to be overcome by a modification in the methods for cleaning the still prior to opening it for inspection or repair.

The British Wood Preserving Association, for the formation of which the Association of Tar Distillers was primarily responsible, has continued to do such valuable work on timber preservation, that it became unnecessary to maintain the Association of Tar Distillers' Creosote Propaganda Committee, which was wound up at the end of 1932.

The Association has welcomed the imposition of the Budget duty of 1d. per gal. on imported hydrocarbon heavy oils, as this has increased the market for creosote oil, of which there was a great surplus which could not find an economic market. A specification has been prepared and issued in collaboration with the British Standards Institution, for creosote for fuel purposes, and many consumers are finding creosote an acceptable alternative to imported fuel oil. The Association has also kept in close touch with the experimental work which is being done on the use of creosote for internal combustion engines, and its conversion by hydrogenation or other means into motor spirit. The Association has co-operated with the British Standards Institution in the preparation of British Standard Specifications for various tar products. The membership of the Association is sixty, and it represents well over 90 per cent. of the tar distilling interests in this country. The officers for the present year are: President, Captain C. F. Ward Jones (Rothervale Collieries Branch, United Steel Companies, Ltd.); vice-president, J. R. Lane (Lancashire Tar Distillers, Ltd.); hon. treasurer, C. E. Carey (South Metropolitan Gas Co.); secretary, J. Davidson Pratt.

Power Alcohol from Molasses

THE Sugar Committee of the Imperial Agricultural Research Council has decided to recommend to the Government that they should meet the cost of equipping two existing commercial distilleries with the special plant required for the production of absolute alcohol and arrange for these to be worked; the Government should also enter into an arrangement with various distributing companies for sale to the public of a mixture of 20 per cent. alcohol and 80 per cent. petrol at reduced prices. The committee considers that an experiment of this nature would afford the basic data on which the Government could come to a decision as to whether legislation would be justified in requiring all petrol in India to be mixed with alcohol.

Society of Dyers and Colourists

Next Year's Jubilee

MEETINGS of the various sections of the Society of Dyers and Colourists at which lectures and discussions have been given have been held during 1933 at Bradford, Huddersfield, Leeds, Manchester, London, Leicester, Nottingham, Derby and Glasgow, and have been well attended. Most of the lectures are contained in the journals issued during the present year. The gold medal of the Society was awarded to Professor Walter Gardner, on relinquishing his post as editor of the Journal as at the end of the year 1932. This award was given at the annual meeting and dinner of the Society held at Leicester in March. Professor F. M. Rowe and Mr. Ellis Clayton were appointed editors of the Journal commencing on January 1, 1933.

The demand for the Colour Index and Supplement published by the Society still continues, the number sold in the present year being very high. The work of standardising the methods of testing the fastness of dyed and coloured materials is now practically finished, the final report having been circulated to the committees which have this matter in hand.

In May, 1934, the Society will hold its jubilee, having commenced in 1884. Arrangements are being made for a civic reception, works visits, visit to the Leeds University and the Wool Research Association, display of finished goods, lectures, annual meeting and dinner and social outings. A special jubilee issue of the Journal is being prepared and the most eminent men available are writing special articles for this issue which will be of great importance to dyeing and allied industries throughout the world.

The Biochemical Society

Increased Membership

THE Biochemical Society was instituted for the purpose of facilitating intercourse between those biologists and chemists who are interested in the investigation of problems common to both, such as the chemical problems connected with agriculture, brewing, animal and vegetable physiology and pathology.

The Society reached its majority in November, 1933, and celebrated the occasion by holding a meeting at University College, London, on November 17, when a large number of the original members of the Society were present at this meeting, which was followed by a 21st birthday dinner at the Hyde Park Hotel, in the evening. The dinner, which was presided over by Sir Frederick Hopkins, P.R.S., had as its guests of honour Professor R.H.A. Plimmer (who was the first secretary of the Society and held office for a number of years), Mr. J. A. Gardner (who has been treasurer of the Society during almost the whole course of its existence), and Professor A. Harden, F.R.S. (who has been senior editor of the "Biochemical Journal" during the whole time that the Journal has been run by the Society).

The membership of the Biochemical Society is now about 835, showing a substantial increase over last year. The Society has held eight meetings during the year at the following places:—Lister Institute of Preventive Medicine; Department of Biochemistry, University College, London; Biochemical Laboratory, Cambridge; Research Laboratories of the Distillers Co., Ltd., Great Burgh, Epsom; Rothamsted Experimental Station, Harpenden, Herts; Boots, Ltd., Research Laboratories, Nottingham; Department of Biochemistry, University College, London; and St. Thomas's Hospital. All these meeting were well attended, and a total of 65 papers were read.

The annual subscription to the Society is two guineas. This subscription entitles members to receive the "Biochemical Journal." Inquiries as to the Society should be addressed to one or other of the secretaries: Professor A. C. Chibnall, Imperial College of Science and Technology, South Kensington, S.W.7, in any matters *except* those connected with meetings of the Society, and Professor H. Raistrick, London School of Hygienic and Tropical Medicine, Keppel Street, Gower Street, W.C.1, for all matters connected with meetings.

Continental Chemical Notes

THE BULGARIAN PLANS for the manufacture of copper sulphate, which were recently announced, have broken down and the project has been shelved.

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SIGNIFICANCE IS ATTACHED to the discovery in the Salinelles district of France of extensive magnesite deposits, a recent analysis of which reveals the percentage composition: Silica, 54.4 parts; magnesia, 21.7 parts; alumina, 3.0 parts.

* * *

BROWN COAL DISTILLATION PLANT, with a contemplated annual output of 200 wagons ot crude oil, has been erected at Dorog by the Salgotarianer Steinkohlenbergbau A.G. The main use of the oil is for railway sleeper impregnation.

* * *

A COPPER SMELTING INDUSTRY is in course of establishment in Czechoslovakia by a new company, The Berg- and Hütten A.G., Montana, who will exploit ore deposits in the Slovakian "Erzgebirge." The company has been formed with a capital of 2,000,000 kronen.

* * *

REDUCED PRICES FOR RADIUM and its salts are foreshadowed by the rationalised methods of uranium ore treatment newly introduced in the Czechoslovakian industry. It is hoped to produce one gram of the pure metal from 60 wagon loads of the ore in place of the 90 wagon loads formerly required.

* * *

THE METALLGESELLSCHAFT, of Frankfort-on-Main, are now publishing a house magazine containing information on technical developments of the concern and economic data on the metal and related industries. This "Mitteilungen aus dem Arbeitsgebiete" will be sent regularly on request to interested parties in England and elsewhere.

* * *

A HELIUM INDUSTRY MAY BE ESTABLISHED in Italy, based upon the fractionation of the residual gases—including methane, hydrogen, nitrogen, argon and helium—which have been identified in the vapours issuing from the soffioni (the volcanic steam jets of the Tuscany marshes). At present a semi-large scale plant is in operation, dealing with 30 cubic metres of residual gas per hour. After complete elimination of carbon dioxide the gas mixture is compressed to 200 atmospheres and liquefied when liquid methane separates. Subsequently, the minute trace of helium present in the remaining mixture of nitrogen, hydrogen and rare gases is isolated by further fractional liquefaction.

* * *

THE FIRST IODINE FACTORY IN ITALY was opened in 1925 with a contemplated output of 100 kg. of crude iodine per day, representing the daily requirement of the Italian people. It is located on Salsomaggiore and the proprietors are the Azienda Termale Demianiale di Salsomaggiore, who now manufacture table salt in addition and utilise the lake waters as a source of bromine and lithium, and also of strontium and calcium salts. The works is about to enlarge its plant with a view to entering the pharmaceutical field.

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A PROPOSED NEW AZO DYESTUFF NOMENCLATURE, explained by Dr. H. Eichler in a recent issue of "Chemiker-Zeitung," sharply distinguishes between azo and diazo components. The components are indicated by their constitutional or commercial names and digits are inserted as indices to indicate the number of azo groups present. Furthermore, monoazo, diazo, trisazo and tetrakiazo dyes are respectively designated by the letters E, Z, T, V. Azo and diazo components are respectively grouped to the left and right of these letters. The coupling position (in the azo components) is distinguished by the indices used to denote the position of entry of the azo groups themselves. Where the coupling position is unknown, the small letters s, a and n are placed in the exponent position to signify acid, alkaline and neutral coupling respectively. Chrysoidine would be designated 1,3-phenylenediamine^{a}E aniline; napthol black (No. 600 in Schultz's register) R – acid^{a} Z α – naphthylamine^{s} E 1 – naphthylamine – 4, 6 – disulphonic acid.

ACETIC ACID AND ACETONE are now being manufactured by the Budapest firm, Plantokemia A.G.

* * *

KEEN INTEREST HAS BEEN AROUSED by proposals for restarting the long abandoned mercury workings in the Palatinate. At present Germany imports mercury to the annual value of 2 to 3 million marks.

* * *

RUINOUS COMPETITION between zinc white manufacturers in Czechoslovakia has now been eliminated by an agreement which will ensure an immediate rise of 30 per cent. in the price-level.

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THE SEARCH BY ITALIAN BIOCHEMISTS for a satisfactory indigenous source of vitamin C (ascorbic acid) had led to the discovery of an exceptionally large proportion in Cayenne pepper (*Capsicum annuum*), as reported in the October issue of "Giornale di Chimica Applicata."

* * *

THE FIRST NUMBER of "Ol und Kohle," a new journal of the fuel industries under the direction of Professor Ubbelohde, has 200 pages and contains a full report of the autumn 1933 conference of the German Society for Mineral Oil Research.

* * *

THE BOARD OF THE I.G. FARBENINDUSTRIE contemplate an appreciable increase in the output of hydrogenated brown coal products at the Leuna works, which, it is estimated, will lead to the additional employment of over 10,000 workers in the manufacturing and distributing branches.

* * *

THE DECEMBER ISSUE of "Kunststoffe" gives details of a process for converting jute into so-called "artificial wool." Brief immersion of the fibres in caustic potash of 25 to 30 per cent. strength is followed by a drying treatment in a rotating drum which imparts the desired airliness. The final product can be woven alone or in mixtures with natural wool, cotton, silk, etc.

* * *

BORINGS BY THE SOVIET AUTHORITIES in Usbekistan and Tadschikistan have revealed, states "Pravda," the occurrence of petroleum in sufficient quantity to meet the requirements of Russian Central Asia as well as other regions of the Soviet Union. According to an official report plans are also under way for exploiting the petroliferous region in the district of Voronesch. The equipment is expected to be in operation not later than 1936, when an annual output of 25,000,000 tons crude oil is anticipated. A pipe-line is being laid down between Voronesch and Machatsch-Kala.

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AN INTERESTING FIELD OF APPLICATION for chlorinated rubber is suggested by its ability to form homogeneous combinations with coal tar, exhibiting a relatively high drop-point. According to A. Nielson ("Metallbörse," December 13, 1933) a market might thus be found for grades of tar of unduly low softening points. The stability and resistance to most chemical reagents which distinguishes modern commercial chlorinated rubber is attained after the maximum theoretical amount of chlorine (65 per cent.) has entered the rubber molecule. Lower chlorinated products are defective either in physical or chemical resistance.

World Caustic Soda Export

WORLD caustic soda exports held quite uniformly for the three years ended 1932 at 220,000 to 230,000 metric tons annually, according to "Chemische Industrie." Principal participants in 1932 were Great Britain, 99,000 tons; United States, 50,000; France, 32,000 tons; Germany, 13,000; and Russia, 12,000. Significant changes since 1930 were a loss of 7,000 tons by the United States and a gain of a like quantity by Great Britain.

Notes and Reports from the Societies

Institution of Chemical Engineers

Annual Meeting Arrangements

THE twelfth annual corporate meeting of the Institution of Chemical Engineers will be held on February 16 at the Hotel Victoria, Northumberland Avenue, W.C.2. Lord Leverhulme will retire from the presidency after two years' service. The nomination of the Council for the vacancies which will arise are as follows: President, Mr. W. Macnab, C.B.E.; vice-presidents, Dr. H. Levinstein and Mr. H. Talbot; hon. secretary, Mr. H. W. Cremer; hon. treasurer, Mr. F. A. Greene; members of Council, Dr. W. R. Ormandy, Mr. C. S. Robinson, Dr. A. J. V. Underwood and Professor S. G. M. Ure; associate-members of Council, Mr. C. Chapman and Mr. W. B. Heaton.

The meeting will follow the procedure which has been so successful in recent years. After the formal business has been transacted, the president will deliver his address, the subject being "Chemical Engineering and the Edible Fat Industry."

Following an adjournment for lunch, Professor C. H. Lander will read a paper on "Modern Methods of Attacking Heat Transmission Problems." The annual dinner will be held in the evening, at which the principal speakers will be Sir E. Hilton Young, Minister of Health, and Mr. F. D'Arcy Cooper.

Chemical Engineering Group

Joint Meeting with Plastics Group

THE next meeting of the Chemical Engineering Group will be held jointly with the Plastics Group of the Society of Chemical Industry on Friday, January 12; at 8 p.m., at the Chemical Society's Rooms, Burlington House, Piccadilly, W.1, when a paper on "Plastics as Engineering Material" will be presented by Mr. Herbert W. Rowell. The chairman of the Group, Mr. W. A. S. Calder, will preside. This paper will deal with the strength, chemical resistance and general properties of the commercial synthetic resin products, with typical examples of their practical application. The author is chairman of the Birmingham Section of the Society.

Institute of Fuel

North-Western Section : Fluid Fuel

AN address on "Fluid Fuels" was delivered by Dr. A. E. Dunstan at a joint meeting of the North-Western Section of the Institute of Fuel and the Manchester Coal Exchange, held at the Engineers' Club, Manchester, on December 19, under the chairmanship of Mr. E. Watson Smyth.

Dr. Dunstan introduced his subject by pointing out the real need for high-pressure distribution of gas in this country, illustrating his remarks with an account of the distribution of gas from the Turner Valley gas field to various points in the United States and Canada, some of them being upwards of 1,000 miles from the source of supply, and the cost to the consumers being two cents per 1,000 cu. ft. per 100 miles. Turning to the major part of his subject, he remarked that there was no foundation whotsoever for the fear that the world's oil supplies were being rapidly depleted.

Most of our present-day knowledge of petroleum technology, continued Dr. Dunstan, had been gained within the past twenty years. This rapid development of the industry, from the time when kerosene was its chief product, was not due to fortuitous circumstances or to haphazard examination of of its potentialities, but almost solely to the systematic and unremitting investigation of innumerable chemical, physical, engineering, and geological problems. "Research" had been, and still was, the watchword of the great oil companies. By realising at the outset that the industry would have to fight for its markets, by realising that its very life would depend on the adoption of a well-designed programme of research, and by realising that "the customer is always right," it had been placed on its present firm basis. In addition to good salesmanship, however, the liaison which had been established between producer and consumer, whereby technical difficulties could be explained and overcome by experts, had further consolidated the position.

Dr. Dunstan then traced the history of petroleum refining, illustrating his remarks with lantern slides, and stressing the value of the process devised by Edeleanu, whereby kerosene is freed from the unwanted, that is, unsaturated and aromatic, hydrocarbons by the simple expedient of mixing the oil with liquid sulphur dioxide, in which these classes of hydrocarbons are soluble. The mixture separates into two layers, the heavier layer containing the sulphur dioxide extract, which is removed and distilled, the sulphur dioxide being thus recovered. The upper layer, containing the refined oil, is similarly treated. This process yields a good quality kerosene at a remarkably small expenditure of reagent, the loss of sulphur dioxide being extremely low. This process is also being employed in the refining of lubricating oils.

In discussing cracking processes, Dr. Dunstan made special reference to a miniature cracking apparatus in which time, temperature and pressure, could be accurately determined, thereby indicating the conditions which would be necessary in carrying out the process on a large scale. Finally, he dealt with the work that had been carried out in the laboratories of the Anglo-Persian Oil Co., for the counter-current continuous washing of petrol—a device which had its origin at Oldbury for the continuous production of the explosive, T.N.T.

Society of Glass Technology

Strength of Glass and Behaviour when Heated

AN ordinary meeting of the Society of Glass Technology was held at University College, London, on December 13, with the president, Mr. G. V. Evers, in the chair. A paper on "The Strength of Glass," was presented by Mr. J. B. Murgatroyd, who discussed strength with reference to surface condition. He described tests made on the thermal endurance of glass bottles which had been purposely scratched. The conditions for producing strong glasses were discussed and it was emphasised that methods of testing the strength should be performed under very definite conditions of heat and surface treatments, and that the size of the test piece should be known. Surface treatment was stated to be the greatest factor affecting the strength of glass. In another paper the behaviour of glass when slowly heated, with special reference to the thermal expansion, was dealt with by Mr. E. Seddon, B.Sc., Ph.D., and Professor W. E. S. Turner.

Institution of the Rubber Industry

Annual Dinner

THE usual annual dinner of the Institution of the Rubber Industry will be in honour of the president, Sir George Beharrell, and will take place at the Prince's Galleries, Piccadilly, London, W.1, on Friday, January 12, at 7.15 for 7.30 p.m. Morning dress will be worn. The price of tickets is 6s. 6d. (excluding wines).

In order that adequate arrangements can be made, members are earnestly requested to inform Mr. W. F. V. Cox as soon as possible of their intention of being present, at the same time indicating with whom they wish to be seated. Separate tables will be arranged for parties.

London Section : Accelerators

THE London Section of the Institution of the Rubber Industry will hold its next meeting on January 8 at the Clarendon Restaurant, Hammersmith, W.6, instead of the First

Avenue Hotel, Holborn, in order to suit the convenience of members residing in the West of London. The following papers will be read: "Accelerators Derived from Piperidine" by Mr. M. W. Philpott, B.Sc.; "Accelerators as an Aid to Quality," by Mr. Maldwyn Jones, B.Sc.; "Accelerators as an Aid to Production," by Mr. Arnold H. Smith.

Institution of the Plastics Industry

London Section : Sales Meeting

THE London Section of the Institution of the Plastics Industry announces that the Governors of the Northern Polytechnic have invited members and their friends to visit the Polytechnic on Monday, January 22, at 7 p.m. The party will be welcomed by Mr. R. L. Roberts, M.A., chairman of the Governing Body of the Polytechnic. At 7.30 p.m. there will be a lecture by Mr. F. H. Cotton, M.Sc., A.I.C., on "The Principles of Rubber Compounding," and at 8.30 p.m. a tour of rubber laboratories and workshops, where some of the processes discussed will be demonstrated. Refreshments will be served at 9 p.m.

Pharmaceutical Society

Isoprene in the Synthesis of Plant Products

AN evening meeting of the Pharmaceutical Society will be held at the Society's House on Tuesday, January 9, at 8.30 p.m., when a lecture on "Isoprene as a Fundamental Unit in the Synthesis of Plant Products" will be given by Dr. I. M. Heilbron, F.R.S., professor of organic chemistry in the University of Manchester. Modern research work has revealed that there exist in Nature numerous groups of substances which, although apparently wholly unrelated, are in effect all chemically derived from the isoprene unit. A general view of some of the more important members of each class will be given, and it will be shown how, by progressively increasing the number of isoprene units, one can pass from the simple essential oils both to the complex carotinoid pigments and to physiologically active and biochemically important substances such as phytol, vitamin A, squalene, and probably the sterols and bile acids. The chair will be occupied by the president of the Society.

Ceramic Society

THE next meeting of the Ceramic Society will be held on Monday, January 8, at 7.30 p.m., at the North Staffordshire Technical College, Stoke-on-Trent, when the following papers will be read: "Rapid Drying of General Earthenware," by Mr. T. Simpson (of Soho Pottery, Ltd.); "Principles underlying the Drying of Clay," by Mr. H. H. Macey, M.Sc., A.R.C.S.

Society of Chemical Industry

Food Group : Refrigeration

THE conditions governing the joint meeting with the British Association of Refrigeration arranged for January 10 have suffered change on account of unforeseen circumstances. The meeting will now take place on Wednesday, January 24, at 8 p.m., at the Institution of Mechanical Engineers, Storey's Gate, Westminster. The subject is to be "Refrigeration in the Food Industry," treated in four paper: (a) General introduction, (b) Solid Co_2, (c) Inspection, and (d) Transport.

Bristol Section : Films on Glass Making

MEMBERS of the Bristol Section of the Society of Chemical Industry are invited to an exhibition of films demonstrating the "Manufacture of Various Types of Glass" at the New Palace Theatre, Baldwin Street, Bristol, on January 16, at 11 a.m. The duration of the films will be about 45 minutes and tickets may be obtained on application to Mr. L. Castle, Pilkington Bros., Ltd., 42-45 Redcliff Street, Bristol.

A joint meeting with the Bristol University Chemical Society will be held in the Chemical Department, at 5.30 p.m. on January 26. The subject will be "The Kinetics of Chemical Reactions," and Mr. C. N. Hinshelwood, F.R.S., will deal with gaseous systems, while solids will be treated by Professor W. E. Garner, D.Sc.

Compliments of the Season

Gifts of Calendars and Diaries

AT this season of goodwill a number of firms in the chemical and allied industries make tangible expression of their good wishes by sending seasonable gifts. A few of these have reached THE CHEMICAL AGE, as follows, and we heartily reciprocate the wishes which have been expressed in so acceptable a form.

DEXINE, LTD.—A wall calendar with monthly tear-off, each page illustrating some different branch of the company's products.

THE GOVERNMENT SOAP FACTORY, BANGALORE.—A calendar pad comprising twelve picture postcards, one of which may be detached and used at the end of each month.

IMPERIAL CHEMICAL INDUSTRIES, LTD. (Dyestuffs Group).—A pocket diary comprising in addition to the replaceable diary, a 72-page booklet of technical information.

KINGS PATENT AGENCY, LTD.—A small blotter for the first half of 1934, together with an acceptable pocket diary from Mr. B. T. King, C.I.M.E.

THE STAVELEY COAL AND IRON CO., LTD.—Pocket wallet with diary and chemical memoranda.

UNITED POTASH CO., LTD.—Potash Note Book, 1934, containing useful information on potash fertilisers.

Paint Marketing Council

Bid to Reduce Seasonal Unemployment

ANNOUNCEMENT was made on December 28 of the formation of a Paint Marketing Council to bring about (a) a wider appreciation of the hygienic and psychological influence of paint in the home and of its value as a preservative of property, and (b) a reduction of the high rate of seasonal unemployment in the paint manufacturing and decorating trades by securing the co-operation of the public in spreading painting and decorating operations over the whole year instead of confining them to the spring. The launch of this movement follows the recent suggestion of the Chancellor of the Exchequer that unemployment might be reduced if work were shared out among a greater number of people over longer periods of the year. Mr. S. Romilly Hall, of Bristol, has been appointed chairman. The offices of the Council at at Tavistock Square, London, W.C.1.

It is estimated that the total costs of painting and decorating, 80 per cent. represents labour and only 20 per cent. materials, while the incidence of unemployment in the winter season is shown by the following figures:—Rate of unemployment in January, 1933, building industry 37.7 per cent., painting and decorating section 51.1 per cent.; rate of unemployment in June, 1933, building industry 20.5 per cent., painting and decorating section 19.2 per cent.

Mr. Romilly Hall, in an interview, said the unemployment figures of insured painters were showing some relative improvement. They were only 29.3 per cent. at November 20, or 11.1 per cent. better than at the same date in 1932, but it was in January that the big rise took place, and they wanted to avert it as far as possible. H.M. Office of Works placed almost fifty per cent. of its painting and decorating work in hand between October and March, and so played its part in relieving unemployment in the industry.

A preliminary list of supporters of the scheme includes the names of 68 paint manufacturing firms, a large number of suppliers of raw materials and members of the British Colour Makers' Association.

News from the Allied Industries

Carbonisation

THE ISSUE OF 3,000,000 ORDINARY SHARES of Low Temperature Carbonisation, Ltd., has been heavily oversubscribed by the shareholders, although the lists were not due to close until December 30.

Artificial Silk

BRITISH BEMBERG, LTD., proposes to extend its Doncaster factory, where about 1,000 workers are on full time. Additional land adjoining the present factory is to be acquired from the Corporation of Doncaster, and it is intended to sink a borehole for additional water supplies needed for the growing activities of the factory.

Cement

A COMPANY WITH A CAPITAL OF £200,000 is to be formed for the establishment of the manufacture of cement and allied products in North Lincolnshire. The promoters have already acquired a considerable area of land in the neighbourhood of Winteringham and South Ferriby. The factory, when completed, will provide employment for about 100 men, the majority of whom will be unskilled. A scheme for housing the employees is part of the promoters' programme.

Iron and Steel

PRESIDING AT THE ANNUAL MEETING of Dorman Long and Co., on December 29, Mr. Charles Mitchell said the company was restarting two additional blast furnaces at Redcar to enable them to meet the increasing demand for pig-iron. Since September they had found work for 2,400 more men, and their present pay-roll would be further increased shortly. Discussing the recent proposals for a merger with the South Durham Steel and Iron Company, Mr. Mitchell said that the Dorman Long directors still firmly advocated the policy of amalgamation. It was, they were convinced, the right policy for all interested in the prosperity of Tees-side.

Non-Ferrous Metals

THE INTERNATIONAL NICKEL CO. and Falconbridge Nickel Mines have been operating their plants recently at almost maximum capacity, and nickel is being turned out in greater volume than in 1929, when the year's production reached 110,000,000 lb.

A SLIGHT DECLINE IN THE WORLD CONSUMPTION of tin is disclosed in the latest analysis prepared by the International Tin Research and Development Council, which covers the month of October. According to preliminary estimates, consumption in that period was 11,500 tons, compared with 11,924 tons in September. In October of the previous year consumption was no more than 7,822 tons, while deliveries in the first ten months of 1933 amounted to 108,655 tons, or 25,575 tons in excess of the total for the corresponding period of the previous year. Among the principal consuming countries, the United States used 52,251 tons of tin during the ten months, compared with 29,397 tons in 1932, an addition of 22,854 tons, or 89.6 per cent. of the increase in world requirements. Consumption in the United Kingdom also increased during 1933, and for the eleven months, 18,299 tons were consumed, as against 17,123 tons for the equivalent period in 1932, an increase of 6.9 per cent.

IMPORTANT DEVELOPMENTS are anticipated at the Seaton Carew Zinc Works, which were acquired three months ago from the Sulphide Corporation by the Northern Smelting and Chemical Co., Ltd., a subsidiary company of the Imperial Smelting Corporation. It is understood that the Seaton Carew works will ultimately supply the whole of the available market for zinc in the North of England. To enable the Seaton Carew works to meet the demand new plant is to be installed. This will comprise a new refining process, the patent rights of which have recently been acquired by the Corporation from America. At present 200 men are employed at the works, which normally employ 500 men.

Asbestos Cement

SHAREHOLDERS OF TURNER AND NEWALL, LTD., have been informed of the financial results of operations during the year ended September 30 last and of the directors' intention to recommend a final dividend on the ordinary shares of 3¾ per cent., raising the total distribution from 3¼ per cent. to 5 per cent. The favourable impression created by the preliminary statement is accentuated by the full report. It is stated that in arriving at the profits for the year (£406,656, against £305,671 for 1931-32) the accounts have been prepared on the same conservative basis as last year. The progress referred to in the interim statement has been steadily maintained and has been shared by all branches of the business. Thus every activity of the company has made an instant response to the upward trading conditions, a position which will gratify directors and shareholders alike. Although the mines have again operated at a profit, this is due more to the continued restriction of development work than to the improvement in trade, as the mines accounts are made up to March 31 in each year.

Rubber

ENCOURAGED BY THE LARGER DEMANDS on the part of consumers and the better prices recently realised, the rubber-producing companies are steadily increasing their output. With the exception of August and September, when comparatively small declines were recorded, the monthly crop returns issued by the Rubber Growers' Association have shown a continuous increase since March. According to the latest returns the combined October output of the 615 companies reporting to the association was 23,509 tons, this being the highest level reached for more than a year. Output for the past eleven months amounts to 231,003 tons, compared with 226,689 tons for the corresponding period of 1932.

ALTHOUGH THE RUBBER CONFERENCES in Holland and in the Dutch East Indies are reported to have made progress, several prominent producers at The Hague are sceptical as to the prospects of a satisfactory solution of the restriction problem. The main difficulties are (1) the question of which year of production is to be taken as the basis for the restriction quota; and (2) the matter of the sliding scale of export duties required to check clandestine exports of native rubber.

Letters to the Editor

Patents Applied for in 1933

SIR,—Although trade returns for the last few months have shown an improvement, the number of patents applied for during 1933 was 36,744 being a decrease of 308 as compared with 1932, when 37,052 patents were applied for.

This state of affairs may afford a grain of comfort to those political economists who hold that inventions decrease employment. The decrease in the number of patent applications is, however, so small that it does not, we think, afford any real ground for argument and, of course, it may be due to various causes; for instance, we are informed by some of our foreign associates that latterly fewer patents have been applied for in this country by their nationals.

The record number of patent applications was made in 1929, the number being 39,898, previously to which there had been a steady increase from the year 1924. Since 1929 the number of patent applications has fluctuated—in 1930 it was 39,359, in 1931 there was a reduction of more than 3,000, while 1932 was better than 1931 by 935. By way of contrast, it may be mentioned that during (approximately) the second half of the 16th century, 55 grants of privilege (patents) were made by the Crown, of which number 21 were to aliens, 30 to natives, while four were for the regulation of trade.—Yours faithfully,

GEE AND CO.,
Patent Agents.

Staple House,
51-52 Chancery Lane, London, W.C.2.

Inventions in the Chemical Industry

Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Accepted with Dates of Application

PYROLIGNEOUS ACID, recovery of the principal constituents.—C. E. Every-Clayton (Produits Chimiques Purs). June 23, 1931. 403,439.

FUNGICIDAL BODIES, manufacture.—Imperial Chemical Industries, Ltd., and T. Callan. April 15, 1932. 403,411.

FUELS in paste, jelly, or like form.—J. S. B. Fleming and Imperial Chemical Industries, Ltd. May 19, 1932. 403,401.

ALIPHATIC ETHERS, production.—E. I. Du Pont de Nemours and Co. May 28, 1931. 403,402.

IONISATION, process and means for the production.—G. Brion and A. J. Krutzsch. June 13, 1931. 403,431.

MOTOR FUELS, production.—M. P. Applebey and Imperial Chemical Industries, Ltd. June 13, 1932. 403,406.

SECONDARY DISAZO DYESTUFFS and their application, manufacture.—Imperial Chemical Industries, Ltd., and A. H. Knight. June 17, 1932. 403,388.

TERPENES, manufacture.—Schering-Kahlbaum Akt.-Ges. July 28, 1931. 403,451.

PRODUCTION of finely-divided metals by precipitation of their salts by means of metals in powdered form.—Trefileries et Laminoirs Du Havre. Aug. 14, 1931. 403,469.

DESTRUCTIVE HYDROGENATION of distillable carbonaceous materials.—J. J. V. Armstrong (International Hydrogenation Patents Co., Ltd.). Sept. 8, 1932. 403,481.

FILTRATION of slimes.—R. A. Henry. June 24, 1932. 403,436.

CELLULOSE ACETATE, production.—A. H. Stevens (E. Berl). April 12, 1933. 403,554.

SOAP, production.—A. W. Keeble and C. H. Miller. July 25, 1933. 403,590.

Complete Specifications Open to Public Inspection

PHENOLS from halogenated aromatic hydrocarbons, manufacture.—Chemische Fabrik von Heyden Akt.-Ges. June 22, 1932. 7189/33.

POTASSIUM OXALATE, process for the production.—R. Koepp and Co. Chemische Fabrik Akt.-Ges. June 20, 1932. 17016/33.

MULTICELLULAR GLASS, process of manufacturing.—Soc. Anon. Des Manufactures Des Glaces et Produits Chimiques De Saint-Gobain, Chauny, et Cirey. June 22, 1932. 17235/33.

AROMATIC OXY-COMPOUNDS, manufacture.—Dr. F. Raschig Ges. June 18, 1932. 17453/33.

CHROMIUM-NICKOL ALLOYS, production.—Heraeus-Vacuum-Schmelze Akt.-Ges. June 21, 1932. 17578/33.

SOLVENTS OR PLASTICISING AGENTS for cellulose derivatives and resins, manufacture and applications of compounds useful as.—L. P. Kyrides. June 20, 1932. 17589/33. (Cognate application, 17590/33.)

AZO DYESTUFFS containing a heavy metal in a complex form, process for the manufacture.—I. G. Farbenindustrie. June 21, 1932. 17592/33.

HYDROGEN CHLORIDE, manufacture and production.—Chemische Fabrik Dr. H. Stoltzenberg. June 22, 1932. 17707/33.

KETEN, manufacture.—E. I. Du Pont de Nemours and Co. June 22, 1932. 17799/33.

INSOLUBLE AZO DYESTUFFS on the fibre, manufacture.—I. G. Farbenindustrie. June 22, 1932. 17811/33.

PEROXIDE SOLUTIONS, stabilisation.—J. R. Geigy Akt.-Ges. June 22, 1932. 17812/33.

Applications for Patents

LIQUID DIOXIDE, manufacture.—S. H. Gordon. Dec. 7. 34493.

PURIFICATION of gases containing nickel carbonyl from sulphur compounds.—C. F. R. Harrison. Dec. 11. 34752.

SYNTHETIC TANNING MATERIALS, manufacture.—I. G. Farbenindustrie and J. Y. Johnson. Dec. 7. 34464.

AROMATIC HYDROCARBONS of low boiling point, manufacture.—I. G. Farbenindustrie and J. Y. Johnson. Dec. 9. 34698.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. Dec. 7. (Germany, Dec. 16, '32.) 34463.

MONOAZO DYESTUFFS, manufacture.—Imperial Chemical Industries, Ltd., and A. H. Knight. Dec. 8. 34580, 34581.

CHLORINATED RUBBER PRODUCTS, manufacture.—Imperial Chemical Industries, Ltd. Dec. 11. 34862, 34863.

MOTOR FUEL, production.—International Hydrogenation Patents Co., Ltd. Dec. 11. (Germany, aJn. 12.) 34753.

MOTOR FUELS.—International Hydrogenation Patents Co., Ltd. Dec. 11. (Germany, March 9.) 34754.

TREATMENT of materials.—Monsanto Chemical Works, Ltd. Dec. 12. 35009.

CATALYSTS.—W. W. Myddleton. Dec. 11. 34878.

1-ALKYLAMINO-4-ARYL-AMINO-ANTHRAQUINONES, manufacture.—Soc. of Chemical Industry in Basle. Dec. 11. (Switzerland, Dec. 10, '32.) 34805.

SALTS of hexavalent chromium and other oxygen compounds, *simultaneous production.*—Bozel-Maletra Soc. Industrielle de Produits Chemiques. Dec. 21. 36011, 36012, 36013, 36014.

PHOSPHATES, method of manufacturing.—Briton Ferry Chemical and Manure Co., Ltd., and J. P. Fraser. Dec. 22. 36171.

DYESTUFFS, fixation on textile fibres.—Calico Printers' Association, Ltd., L. A. Lantz and A. L. Morrison. Dec. 22. 36175.

BUTYL ALCOHOL, etc., production by fermentation.—Commercial Solvents Corporation. Dec. 27. 36410, 36411.

POLYHYDRIC ALCOHOLS, manufacture.—E. I. Du Pont de Nemours and Co. Dec. 21. (United States, Dec. 23, '32.) 35971.

HYDROBIETYL ALCOHOLS.—E. I. Du Pont de Nemours and Co. Dec. 21. (United States, Dec. 21, '32.) 36051.

DIBENZANTHRONE SERIES, manufacture of compounds.—E. I. Du Pont de Nemours and Co. Dec. 23. (United States, Dec. 27, '32.) 36207, 36208.

DYESTUFFS of benzanthrone series, manufacture.—E. I. Du Pont de Nemours and Co. Dec. 23. (United States, Dec. 27, '32, and May 5.) 36209, 36210.

BASES derived from benzdioxane, manufacture.—L. S. E. Ellis (Soc. des Usines Chimiques Rhone-Poulenc). Dec. 23. 35237.

SULPHONIC ACIDS, process for making.—Fleschwerke A.G. für Gerbstoffabrikation u. Chem. Produkte and W. W. Triggs. Dec. 29. 36579.

ALKALI SALTS of naphthalene-1-sulphonic acid, manufacture.—J. R. Geigy, A.-G. Dec. 21. (Germany, Dec. 22, '32.) 35960.

ORGANIC CYANOGEN COMPOUNDS and their application.—Grasselli Chemical Co. Dec. 29. (United States, Dec. 29, '32.) 36656, 36657.

POLYVINYL ESTERS, manufacture.—W. W. Groves and I. G. Farbenindustrie. Dec. 27. 36372.

LITHIUM, recovering.—H. Heinrich Hutte Ges. and Metallges A.G. Dec. 29. (Germany, Dec. 29, '32, and Sept. 21.) 36651, 36652.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie and J. Y. Johnson. Dec. 22. 36126.

ACETALDEHYDE, manufacture from acetylene.—I. G. Farbenindustrie and J. Y. Johnson. Dec. 27. 36364.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie and J. Y. Johnson. Dec. 29. 36632.

DYEING and printing cellulose esters, etc.—I. G. Farbenindustrie and J. Y. Johnson. Dec. 30. 36701.

AZO COMPOUNDS, manufacture.—I. G. Farbenindustrie. Dec. 23. (Germany, Dec. 24, '32, and Nov. 30.) 36232, 36233.

DIAZO DYESTUFFS insoluble in water.—I. G. Farbenindustrie. Dec. 27. (Germany, Dec. 23, '32.) 36367.

SULPHURISED DYESTUFFS, manufacture.—I. G. Farbenindustrie. Dec. 29. (Germany, Jan. 31.) 36616.

DIARYLAMINE DERIVATIVES, manufacture.—Imperial Chemical Industries, Ltd., R. W. Kersey, H. Smith and M. Wyler. Dec. 27. 36414.

CHEMICAL MANUFACTURE.—Mathieson Alkali Works. Dec. 30. (United States, Jan. 14.) 36729.

ALKALI SULPHIDES, manufacture.—Naamlooze Vennootschap Stikstofbindingsindustrie Nederland. Dec. 28. (Germany, Dec. 28, '32.) 36489.

SYNTHETIC RESINS.—S. L. M. Saunders. Dec. 21. 35999.

SEPARATION OF ZIRCONIA.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de Saint-Gobain, Chauny, et Cirey. Dec. 21 and 22. (France, Dec. 23, '32, and Nov. 29.) 36022, 36023.

INDIGOID DYESTUFFS, manufacture.—Soc. of Chemical Industry in Basle. Dec. 21 and 22. (Switzerland, Dec. 21 and 27, '32.) 35959, 36129.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

MOST sections of the chemical market have transacted moderate business during the past week, and amongst industrial chemicals interest has been centred chiefly in acetone, formaldehyde, formic acid and oxalic acid. There has been a slightly smaller demand for salammoniac and sodium acetate than of late, and barium chloride, potassium carbonate and caustic potash have been dull items. Supplies of acetates of lime are scarce. The prices of most products remain unaltered but there has been a reduction of an average of 2d. per gal. in all grades of methylated spirits. Prospects in the coal tar products market are reported to be bright for 1934. The recent improvement in cresylic acid sales continues and solvent naphtha, naphthalene and creosote oil are in good demand. Carbolic acid, crude 60's, are a penny per gal. cheaper, but solvent naphtha, 90/160 is 2d. per gal. dearer. Export prices of coal tar pitch have been reduced. Only limited business has been done in pharmaceutical products, and there have been fairly large reductions in the prices of phenolphthalein and iodides. A number of essential oils have been reduced in price and business in this section has been somewhat dull.

LONDON.—Markets have been rather quiet since the re-opening of business due to the holiday season and stock-taking period. Prices continue firm and the only price alteration of note is in the case of soda bichromate where prices have been advanced to 3d. per lb. net for spot lots and 4d. per lb. with discounts for contract quantities varying according to the quantity taken. Owing to the recent holidays, the coal tar products market is rather quiet, and there is little change to report.

MANCHESTER.—Business in chemicals has opened rather quietly on the Manchester market this week, but traders generally are inclined to take rather an optimistic view of the outlook. Year-end price changes in the leading products have been extremely few and they have certainly been a good deal less numerous than in previous years. In this respect, the prospects are for a continuation of the firm conditions which have ruled in most sections of the market during the past twelve months, with conditions favouring advances rather than reductions in most cases. Just before the break for the holidays, new contract bookings on this market in respect of the soda, potash, and other products were on a satisfactory scale, and deliveries to users' works this week hav been quite good considering the time of the year.

SCOTLAND.—The Christmas and New Year holidays, just completed, have resulted in the absolute stagnation of the Scottish heavy chemical market.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80% £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in 1-ton lots upwards.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—LONDON: 9½d. per lb.; less 5%. MANCHESTER: 9½d.

ACID, CRESYLIC.—97/99%, 1s. 1d. to 1s. 7d. per gal.; 98/100%, 1s. 5d. to 2s.

ACID, FORMIC.—LONDON: £47 10s. per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £49 to £52 ex store. MANCHESTER: £48 to £54 ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations; 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—LONDON: 11½d. per lb. SCOTLAND: B.P. crystals, 11d., carriage paid. MANCHESTER: 1s. 0½d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £32 per ton; powdered, £34, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £26 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC.—LONDON: £16 10s. c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £21 at mines.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot 35/37% £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 in 5/6 cwt. casks for contracts over 1934/1935.

BORAX, COMMERCIAL.—Granulated, £15 10s. per ton; powder, £17 packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—2s. 7d. to 2s. 11d.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—3½d. to 5d. per lb.

CARBON TETRACHLORIDE.—£41 to £46 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K. Green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3¼d. per lb. Liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—LONDON: £3 19s. per cwt.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £27 per ton. SCOTLAND: 40%, £28 ex store.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £34 to £36; brown, £32

LEAD NITRATE.—£28 per ton. MANCHESTER: £27 10s. to £28.

LEAD, RED.—SCOTLAND: £25 10s. to £28 per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid.

LITHOPONE.—30%, £17 10s. to £18 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial, 1s. 6d. to 2s. 1d. per gal. Pyridinised Industrial, 1s. 8d. to 2s. 3d. Mineralised, 2s. 7d. to 3s. 1d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—8½d. to 9d. per lb. without engagement.

POTASH, CAUSTIC.—LONDON: £42. MANCHESTER: £40 to £41.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £38.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¾d. to 9d. per lb. SCOTLAND: B.P. crystals, 8½d. MANCHESTER: Commercial, 8¼d. to 8¾d. according to quantity in 2-cwt. drums; B.P., 9d. to 9½d. according to quantity in 1-cwt. drums.

POTASSIUM PRUSSIATE.—LONDON: 8¼d. to 8¾d. per lb. SCOTLAND: Yellow spot material, 8¼d. ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot, £14 5s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 15s. in casks, Solid 76/77%, £14 10s. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 10s. contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£22 per ton. LONDON: £23.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lb. net for spot lots and 4d. per lb. with discounts for contract quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. net.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£32 per ton.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £15 ex station, 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.

SODIUM NITRATE.—LONDON: Spot, £18 to £20 per ton d/d station in drums.

SODIUM PERBORATE.—LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£12 10s. per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 4¾d. to 5¾d.

SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station, returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground Spot, £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £9 10s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £15 10s. per ton f.o.b.

SULPHUR.—£11 per ton. SCOTLAND: Flowers, £11; roll, £10 10s.; rock, £9; ground American, £10 ex store.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 4s. 3d. to 4s. 5d. per lb.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON AND SCOTLAND: £12 per ton.

ZINC SULPHIDE.—11d. to 1s. per lb.

Pharmaceutical and Fine Chemicals

CITRONELLOL.—8s. per lb.

IODINE RESUB., B.P.—7s. 9d. for 1-cwt. lots.

IODOFORM, B.P., CRYST., PRECIP., OR POWDER.—10s. for 28-lb. lots.

PHENOLPHTHALEIN.—2s. 7d. to 3s. 3d. per lb.

POTASS. IODIDE, B.P.—6s. 4d. for 1-cwt. lots.

SODIUM IODIDE, B.P.—7s. 5d. for 28-lb. lots.

Essential Oils

CITRONELLA, JAVA.—2s. per lb.

LAVENDER, MONT BLANC, 38/40%.—15s. per lb.

PEPPERMINT.—Japanese, 3s. 8d. per lb.; Wayne County, 12s. per lb

Coal Tar Products

ACID, CARBOLIC.—Crystals, 8¼d. to 8¾d. per lb.; crude, 60's, 2s. 4d. to 2s. 5d. per gal. MANCHESTER: Crystals, 8¾d. per lb.; crude, 2s. 5d. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d. to 2s. 7d.

ACID, CRESYLIC.—90/100%, 1s. 8d. to 2s. 3d. per gal.; pale, 98%, 1s. 6d. to 1s. 7d.; according to specification; refined, 1s. 10d. to 2s. LONDON: 98/100%, 1s. 3d.; dark, 95/97%, 11d. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; 97/99%, 1s. to 1s. 1d.; dark, 97/99%, 11d. to 1s.; high boiling acid, 2s. 6d. to 3s.

ANTHRACENE OIL.—Strained, 4½d. per gal.

BENZOL.—At works, crude, 10d. to 10½d. per gal.; standard motor 1s. 5d. to 1s. 5½d.; 90%, 1s. 5½d. to 1s. 6d.; pure, 1s. 8½d. to 1s. 9d. LONDON: Motor, 1s. 6½d. SCOTLAND: Motor, 1s. 6½d. to 1s. 7½d.; 90%, 2s. 0½d. to 2s. 1½d.

CREOSOTE.—B.S.I. Specification standard, 3½d. to 3¾d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. London. MANCHESTER: 3d. to 4¼d. SCOTLAND: Specification oils, 3½d. to 4d.; washed oil, 3½d. to 4d.; light, 3¼d.; heavy, 4½d. to 5d.

NAPHTHA.—Solvent, 90/160%, 1s. 6d. to 1s. 7d. per gal.; 95/160%, 1s. 8d. to 1s. 9d.; 99/190%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Crude, Hot-Pressed, £6 1s. 3d. per ton. Flaked £10 per ton. Purified crystals, £9 15s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.

REFINED COAL TAR.—SCOTLAND: 4d. per gal.

TOLUOL.—90%, 2s. 9d. to 2s. 10d. per gal.; pure, 3s. 3d.

XYLOL.—Commercial, 2s. 9d. to 2s. 10d. per gal.; pure, 3s.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.

BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.

p-CRESOL 34-5° C.—2s. per lb. in ton lots.

m-CRESOL 98/100%.—2s. 3d. per lb. in ton lots.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C. 10d.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags; £79 5s. in casks, in 1-ton lots.

α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 10d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. per lb.; 5-cwt. lots, drums extra.

NITRONAPHTHALENE.—9d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.

o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works

p-TOLUIDINE.—Spot, 1s. 11d. per lb., d/d buyer's works.

m-XYLIDINE ACETATE.—4s. 6d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Home, £7 1s. 6d. per ton; export, nominal, £6 12s. 6d. f.o.b., U.K. ports in single bags.

CYANAMIDE.—£7 3s. per ton, carriage paid to railway station.

NITRATE OF SODA.—£7 16s. per ton nearest station.

NITRO-CHALK.—£7 5s. per ton nearest station.

CONCENTRATED COMPLETE FERTILISERS.—£10 15s. to £11 6s. per ton according to percentage of constituents.

NITROGEN PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton according to percentage of constituents.

Latest Oil Prices

LONDON, Jan.2.—LINSEED OIL was easy. Spot, £9 15s. (small quantities 30s. extra; Jan., £18 5s.; Jan.-April, £18 10s.; May-Aug., £18 17s. 6d.; Sept.-Dec., £19 5s., naked. RAPE OIL was slow. Crude extracted, £25; technical refined, £26 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £14; refined common edible, £17; and deodorised, £18 10s., naked, ex mill (small lots 30s. extra). TURPENTINE was firm, American, spot, 43s. per cwt.

HULL.—LINSEED OIL.—Spot quoted £19 7s. 6d. per ton; Jan., £18 17s. 6d.; Jan.-April, £19; May.-Aug., £19 5s. COTTON OIL.—Egyptian, crude, spot, £13 15s.; edible refined, spot, £16 5s.; technical, spot, £16 5s.; deodorised, £18 5s., naked. PALM KERNEL OIL.—Crude, f.m.q., spot, £17, naked. GROUNDNUT OIL.—Extracted, spot, £19 10s.; deodorised, £23 10s. RAPE OIL.—Extracted, spot, £24; refined, £25 10s. SOYA OIL.—Extracted, spot, £17 10s.; deodorised, £20 10s. per ton. COD OIL, 21s. per cwt. CASTOR OIL.—Pharmaceutical, 35s. 6d.; first, 30s. 6d.; second, 27s. 6d. per cwt. TURPENTINE.—American, spot, 45s. per cwt.

From Week to Week

THE EDITORIAL OFFICES of "The Fertiliser, Feeding Stuffs and Farm Supplies Journal" have moved to 16 Mark Lane, E.C.3.

MR. FRANCIS WARRAND GREVILLE WILLIAMS, of 38 Hyde Park Gate, W., and managing director of Williams (Hounslow), Ltd., aniline dye manufacturers, aged 74 years, left £111,148 (net personalty £109,292).

A PRELIMINARY LIST OF EXHIBITORS at Birmingham section of the British Industries Fair is now available. The section will be open from 10 a.m. to 6 p.m. every day, excepting Sunday, from February 19 to March 2.

MR. B. H. BINDER, of the India Rubber, Gutta Percha and Telegraph Works, is resigning his position as chairman, and Sir Walrond Sinclair will succeed him. Sir Walrond is chairman of British Goodrich Rubber, which has acquired control of the India company.

THE NADA COMPANY, LTD., 150 Southampton Row, W.C.1, has increased its nominal capital by the addition of £2,500 beyond the registered capital of £100. The additional capital is divided into 2,500 10 per cent. cumulative preferred ordinary shares of £1 each.

THE NOMINAL CAPITAL of Bourjois, Ltd., manufacturers of perfumery goods, etc., 4 Water Lane, E.C., has been increased by the addition of £80,000 beyond the registered capital of £15,000. The additional capital is divided into 80,000 7 per cent. cumulative redeemable preference shares of £1.

A CONFERENCE ON ATOMIC PHYSICS will be held this year under the auspices of the Physical Society. The conference, which will be opened by Lord Rutherford, will mark an epoch, as it will be the first of its kind to be held in England. The details of the programme are not yet settled, but it is expected that the conference will last over two days at least, and that some of the meetings will be held in London and some at Cambridge.

THE GERMAN NITRATE INDUSTRY has just been taken another step in nationalisation. One of the most important nitrate producers, the Central German Nitrate Works, is to be merged with the Bavarian Nitrate Works. The Central German concern's capital is 20,000,000 marks (£1,000,000 at par), but the bulk of this has been held by the Bavarian concern since the beginning of 1933. Although the Bavarian concern will absorb the Central German company, it will increase its capital only from 12,000,000 marks (£600,000) to 13,800,000 marks (£690,000).

TO COPE WITH INCREASING SALES and to render greater service to clients, Ronsheim and Moore have established their own branch in Manchester, the address of which is 14 St. Peter's Square, Manchester (telephone: Central 6346). Previously, this territory has been worked through the agency of Dunn Brothers' Successors, Ltd. Mr. Mitchinson, director of that firm, who has been concerned with the department looking after the Ronsheim and Moore agency, will take over the managership of the Manchester office.

THE REPORT OF THE LAUTARO NITRATE CO., which is controlled by Cosach, for the year to June 30, 1933, states that the accounts have been drawn up on a comparabe basis with 1931-32, but with the intention of affecting in the present year requisite changes and adjustments emanating from resolutions to be taken with respect to the servicing of the company's obligations. In view of the fact that the company is operating under moratorium and reorganisation plans are in process of development in which capital valuation may be subject to readjustment, it has been deemed impracticable to reflect in profit and loss any charges for depreciation, depletion or unamortised bond discount and stock issue expenses.

THE FOLLOWING RESOLUTION was passed by the Executive Council of the Chemical Workers' Union at its December meeting:—"The Executive Council of the Chemical Workers' Union, after careful consideration of the grave financial difficulties confronting the voluntary hospitals of this country, due in part to the severe economic and financial crisis, strongly urges H.M. Government to introduce legislation designed to alleviate the existing financial position of these hospitals. We therefore call upon the Government to assst the hospitals by taking necessary steps to relieve all voluntary hospitals from payment of local rates by granting similar exemption from payment of rates as at present enjoyed by churches and other religious institutions. The Council further affirms that until all voluntary hospitals are co-ordinated under a State medical service, the services rendered to the community by the hospitals will not reach their maximum efficiency. In furtherance of these proposals the Council urges local authorities to give favourable consideration to any moves in the directions indicated." Copies of the resolution were forwarded to the Prime Minister and the Minister of Health.

WE REGRET TO RECORD the death of Mr. Edward Herbert, chairman of Kemball, Bishop and Co., Ltd., of Crown Chemical Works, Bromley-by-Bow, which occurred on Wednesday.

THE ADDRESS of the Nor-Rust Liquid Lead Co., Ltd., has been changed to 41 Spenser Street, Victoria Street, London, S.W.1 (telephone number: Victoria 4800/1).

MAJOR-GENERAL J. F. C. FULLER and Professor A. W. Nash, of the Birmingham University, have become hon. members of the League of Science (British Empire Section).

NOTICE WAS GIVEN in the "London Gazette" of December 29 of the voluntary winding up of the Manchester and Sheffield Tar Works, Ltd., Mr. H. D. Leather, of "Wharfecote," Ben Rhydding, and Mr. T. W. Howard, of Castle View, Conisborough, near Rotherham, have been appointed joint liquidators.

STANDARD SHADES ON HEMP AND STRAW are shown on a new colour card issued by Imperial Chemical Industries, Ltd. This card gives recommendations for dyeing the standard shades of the London and Luton Bleachers' and Dyers' Association for Spring, 1934.

THE COUNCIL OF TRALEE, County Kerry, has made application to the Irish Free State Minister for Industry and Commerce requesting him to have one of the industrial alcohol distilleries, which the Government proposes to establish, built in that district. The Minister (Mr. Sean Lemass) has promised to give sympathetic consideration to the request.

FIRE BROKE OUT IN THE LABORATORY at the South Metropolitan Gas Company's works at East Greenwich on December 30. The fire brigade, equipped with eleven engines, two escapes and gas appliances tender, prevented the flames from extending to the gas plant and stores, but part of the laboratory was burnt out.

THE 19TH EDITION of "Patents and Trade Marks," issued by Kings Patent Agency, Ltd., Wardrobe Chambers, 146a Queen Victoria Street, E.C.4, is now ready and will be sent post free to applicants. This is a very useful booklet for the advice of inventors who wish to clear up some difficulty in the legal procedure.

THE Société des Phosphates d'Algerie of de Tunisie, the recently established merger of North African producers, is endeavouring to convoke a world conference of phosphate interests. It would appear, according to a French report, that both the American and Soviet Russian interests have expressed willingness to co-operate.

SIR ERNEST BENN, speaking at a luncheon of the Incorporated Sales Managers' Association, at the Holborn Restaurant, on Wednesday, declared that there did not exist two million human beings who could think. The youngster of to-day started in an educational machine which was a mass production machine. When this youngster went to work his whole life must be regulated.

SATISFACTION to the extent of £500,000 on May 31, 1930, of debentures authorised by resolutions dated December 30, 1909, to July 18, 1922, and registered on various dates from May 27, 1910, to September 27, 1922, and to the extent of £200,000 on November 15, 1933, of debenture stock authorised May 6, 1930, and registered May 28, 1930, were filed on December 20, 1933, by the Aluminium Corporation, Ltd.

MR. WILLIAM HORTON, M.Sc., director of George Hadfield and Co., Ltd., chemical fertiliser manufacturers, Liverpool, presented Mr. Charles J. Williams, a director of the firm, with his portrait in oils at a dance given by Mr. Williams to the staff and employees on December 29. The portrait is the gift of the directors and other connections of the late Samuel and Herbert Horton, the former heads of the firm. Mr. Williams, who recently completed a sixty years' association with the firm, has also been presented with a piece of silver plate on behalf of the employees and staff.

SCIENTIC RESEARCH in the University of Wisconsin is to be stimulated on a lavish scale by relieving thirty-six full professors of all teaching duties, for periods ranging from a semester to a year, to devote themselves to research in various fields of pure and applied science. This new departure in university policy is the more striking by reason of the source from which it is being financed, namely, the Wisconsin Alumni Research Foundation, a non-profit-making corporation holding the patents of many discoveries made at the university by members of the faculty and using the income derived from them to promote more research. Most famous among these patents is one relating to the Steenbock process by which the vitamin D potencies of cod liver oil and other substances have been standardised and raised by irradiation with ultra-violet light.

Forthcoming Events

Jan. 8.—Institution of the Rubber Industry (London Section). "Accelerators Derived from Piperidine." M. W. Philpott. "Accelerators as an Aid to Quality." Maldwyn Jones. "Accelerators as an Aid to Production." Arnold H. Smith. First Avenue Hotel, High Holborn, London.

Jan. 8.—Institution of Chemical Engineers. Joint meeting with the Society of Chemical Industry (London Section). "Legal Pitfalls for the Chemical Engineer." J. Davidson Pratt and G. S. W. Marlow. 6 p.m. Burlington House, London.

Jan. 8.—Ceramic Society. "Rapid Drying of General Earthenware." T. Simpson. "Principles Underlying the Drying of Clay." H. H. Macey. 7.30 p.m. North Staffordshire Technical College, Stoke-on-Trent.

Jan. 9.—Hull Chemical and Engineering Society. "Ships' Compositions." H. W. Keenan. 7.45 p.m. Grey Street, Park Street, Hull.

Jan. 9.—Institute of Metals (N.E. Coast Section). "Welding," by a Representative of Metropolitan-Vickers Electrical Co., Ltd. 7.30 p.m. Armstrong College, Newcastle-on-Tyne.

Jan. 9.—Institution of Petroleum Technologists. "Oxidation Lubrication and the Blending of Mineral Oils to obtain Maximum Lubricating Value." R. O. King. 5.30 p.m. John Street, Adelphi, London.

Jan. 9.—Pharmaceutical Society. "Isoprene as a Fundamental Unit in the Synthesis of Plant Products." Professor I. M. Heilbron, F.R.S. 8 p.m. 17 Bloomsbury Square, London.

Jan. 10.—Institute of Chemistry (Belfast Section). Film Exhibit. 7.45 p.m. Royal Belfast Academical Institution.

Jan. 10.—Electrodepositors' Technical Society. Joint meeting with Institute of British Foundrymen (London Branch). "The Manufacture of Castings for Electroplating." "The Plating of Castings." G. C. Pierce. 8.15 p.m. Northampton Polytechnic Institute, St. John Street, Clerkenwell, London.

Jan. 11.—Institute of Chemistry (Manchester Section). "A Leaf from Bacon." Major F. A. Freeth. 7 p.m. Queen's Hotel, Manchester.

Jan. 11.—Institution of the Rubber Industry (Midland Section). "Air Wheel Tyres for Passenger Cars." L. R. Mernagh. Grand Hotel, Birmingham.

Jan. 11.—Institute of Metals (London Section). "Beryllium and its Alloys." H. A. Sloman. 7.30 p.m. 83 Pall Mall, London.

Jan. 11.—Oil and Colour Chemists' Association. "Tung Oil: Studies of its Technical Characteristics." L. A. Jordan. 7.30 p.m. 30 Russell Square, London.

Jan. 11.—Society of Chemical Industry (Bristol Section). Joint meeting with the Plastics Group and the Oil and Colour Chemists' Association. "The Development of Synthetic Pigments and Resins." Noel Heaton. 7.30 p.m. University Chemical Department, Bristol.

Jan. 12.—Oil and Colour Chemists' Association (Manchester Section). "Mono Azoic Dyestuffs and Lake Colours and their Applications." A. H. Whittaker. College of Technology, Manchester.

Jan. 12.—The Institute of Chemistry (Huddersfield Section). "Theories of Valency." Professor R. M. Caven.

Jan. 12.—Society of Chemical Industry (Plastics Group). Joint meeting with the Chemical Engineering Group. "Plastics as Engineering Material." H. W. Rowell. 8 p.m. Burlington House, London.

Jan. 12.—Institute of Metals (Sheffield Section). "Protection from Corrosion of Aluminium and its Alloys." N. D. Pullen. 7.30 p.m. University, Sheffield.

Books Received

Die Technik der Chemischen Operationen. By Dr. Walter Bader. Basle: B. Wepf. and Cie. Pp. 416. S.frs. 18.

Outlines of Organic Chemistry. By F. J. Moore, revised by William T. Hall. London: Chapman and Hall, Ltd. Pp. 338. 16s. 6d.

Chemical Trade Inquiries

Argentina.—The Commercial Counsellor to H.M. Embassy at Buenos Aires reports that the Argentine State Oilfields Department is calling for tenders for the supply of the following chemicals:—65,000 kilos sulphate of aluminium (industrial), granulated fine, not pulverised; 10,000 kilos sulphate of aluminium, pulverised, in bags of 70 kilos nett as a maximum; 80,000 kilos concentrated sulphuric acid (industrial); 17,000 kilos bicarbonate of sodium (industrial); 8,650 kilos bicarbonate of sodium (industrial) pulverised, in wooden barrels of 200 kilos each; 25,000 kilos carbonate of sodium (Solway) in jute bags of 70 kilos nett each; 60 litres tetrachloride of carbon for hand fire extinguishers "phyrenes," in containers of 1 litre each; 200 litres carbonic acid free from oxygen, with a proportion of nitrogen inferior to 1 per cent. Tenders must be presented in Buenos Aires, by a legally authorised representative, on stamped paper, not later than January 25, accompanied by a certificate of deposit in the Bank of the Nation, either in cash or national bonds, equivalent to 1 per cent. of the total tender price. A copy of the specification (in Spanish) and the general conditions of tender may be inspected by interested United Kingdom firms at the offices of the Department of Overseas Trade (Room 52), 35 Old Queen Street, London, S.W.1.

England.—The County Roads Committee of the Devon County Council invites tenders for the supply, for the twelve months ending March 31, 1935, of refined tar, bitumen and bituminous or tar-bitumen compounds, explosives, etc. All the rural authorities in Devon and nearly all the urban authorities have agreed not to invite separate tenders for these requirements, but to purchase only under the county roads tender. Tenders on the forms provided have to be delivered to the Clerk to the Council, Mr. Brian S. Miller, at The Castle, Exeter, not later than January 31.

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Austria.—An agent established at Vienna wishes to obtain the representation, on a commission basis (or terms to be arranged), of United Kingdom manufacturers and exporters of raw rubber and rubber, thread, metals, ores and chemicals. (Ref. No. 13.)

Czechoslovakia.—A firm established at Prague wishes to obtain the representation, on a commission basis, of United Kingdom manufacture of the egg white and liquid egg yolk, tanning materials, shellac and heavy chemicals. (Ref. No. 17.)

Danzig.—A firm domiciled in Danzig and Gydnia desires to secure the rpresentation for Poland of United Kingdom manufacturers of pharmaceuticals, chemicals and drugs. (Ref. No. 18.)

Holland.—A firm established at The Hague wishes to obtain the representation of United Kingdom manufacturers or exporters of gums, resins and moulding powders for Holland. (Ref. No. 24.)

Switzerland.—An agent established at Zurich wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of industrial chemicals, especially products for the manufacture of boot and floor polishes, varnishes, chemicals for dyeing and tanning; aniline dyes, dry colours; fruit essences, synthetic perfumes and drugs. (Ref. No. 28.)

Company News

U.S. Smelting, Refining and Mining Co.—A regular quarterly dividend of 25 cents per share and an extra dividend of $3.50 per share have been declared.

Liebig's Extract of Meat.—A final ordinary dividend of 5 per cent. is announced, making 9 per cent., tax free, for the year to August 31, 1933, as in the previous year. Dividend payable on January 24.

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General Secretary, B.A.C.

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'Phone : Regent 6611

ADVERTISERS please note that the latest hour at which we can accept advertisements for insertion in these columns each week is 10 o'clock on Thursday morning.

APPOINTMENTS VACANT

(1s. per line; minimum charge 3s. Sixpence extra is charged when replies are addressed to Box Numbers.)

CHEMISTS. When vacancies for Industrial Chemists occur the leading Manufacturers apply to Hanid and Co Appointments Bureau, 186 Shaftesbury Ave., W.C.2. All Chemists should enrol (no preliminary fee).

ENGINEER required to represent leading British firm manufacturing Chemical Plant in non-ferrous metals. Age 27-35. Good opportunity and salary for right man Write, giving full details of education, experience, and salary required to Box 1540, THE CHEMICAL AGE, 154 Fleet Street, London, E.C.4.

WANTED Immediately.—Fully Qualified CHEMIST with experience of Manufacture of Intermediates and Nitro-Toluenes. Reply fully to Box 1541, THE CHEMICAL AGE, 154 Fleet Street London, E.C.4.

APPOINTMENTS WANTED

(Prepaid—Twenty-seven words 1s. 6d.; every additional nine words 6d.) Replies can be received "Box , Office of this Journal," in which case our address is included in cost of advertisement, and charged as nine words.

BOYS of good character, well-trained and eager to work, will be gladly recommended by the Warden of the John Benn Hostel, Bower Street, E.1.

BUSINESS OPPORTUNITIES

(1s. per line; minimum charge 3s.)

SPLENDID Opportunity for Chemist at Orpington Garden Estate. Modern Shop; write or call. Shops also available on Godstone Road, Whyteleaf, Surrey; particulars on request. E. O'SULLIVAN (KENLEY), LTD., Arterial Road, St. Mary Cray, Kent.

FOR SALE

(1s. per line; minimum charge 3s. Sixpence extra is charged when replies are addressed to Box Numbers.)

BEDROOM SUITES in figured walnut and Three Piece Suites to be cleared prior to stocktaking, under cost price. Magnum Cabinet Co., Ltd., 287/289 Old Street, London, E.C.1.

CHARCOAL, ANIMAL and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Hill Jones Pop., London." Telephone: 3633 East.

HYDRAULIC PRESSES AND PUMPS. Large stock in London. Price quoted for adapting and erecting.—THOMPSON AND SON, Maria Street, Millwall.

LABORATORY BENCH, 8 ft. x 3 ft., fitted 4 drawers, 2 gas brackets, and sunk porcelain sink. Cost £27. Accept any reasonable offer. Hanovia, Slough.

MIXERS by Werner and other makers, jacketed pans, disintegrators, grinders, good stock.—C. F. DAVIS, LTD., Hatcham Road, Old Kent Road, London, S.E.15.

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PATENTS & TRADE MARKS

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KINGS PATENT AGENCY, LTD. (B. T. King, Registered Patent Agent, G.B., U.S., and Can.), 146a Queen Victoria Street, London, E.C.4. "Advice Handbook," and Cons. free; 47 years' ref. 'Phone: Central 0682.

ADVICE on Protection of Inventions and Registrations of Trade Marks. Send for free booklets. REGINALD W. BARKER AND CO., Patent Agents, 56 Ludgate Hill, E.C.4. (Estab. 1886.) Telephone: City 5140.

PATENTS obtained, trade marks and designs registered, at home and abroad.—GEE AND CO. (Patent and Trade Mark advisers to THE CHEMICAL AGE), 51-52 Chancery Lane, London, W.C.2. Telephone: Holborn 1525. Established 1905.

THE Owners of Patent No. 267,263 are desirous of arranging by way of licence or otherwise on reasonable terms for the commercial development in Great Britain of this invention, which concerns improved silver alloys. For particulars address H. Douglas Elkington, Consulting Chemist and Chartered Patent Agent, 20 to 23 Holborn, London, E.C.1.